Canon
SERVICE INFORMATION
Issued by Office Imaging Products Quality Assurance Center, Canon Inc.

MODEL: NP7161/NP7160/NP7210

No. : F-04-E017
DATE : DEC., 1998

LOCATION
SUBJECT

Revised Service Manual

We are issuing revised Service Manual. Please go over the descriptions that follow for the manual.
The manual has been revised to accommodate the addition of new models NP7210.
Particulars

Name of Service Manual	: NP7161/NP7160/NP7210
Type of Revision	: Full revision

Kindly replace the previous with the one being issued.

FY8-13FB-01Y

Printed in Japan
Imprimé au Japon

REVISION PAGE LIST

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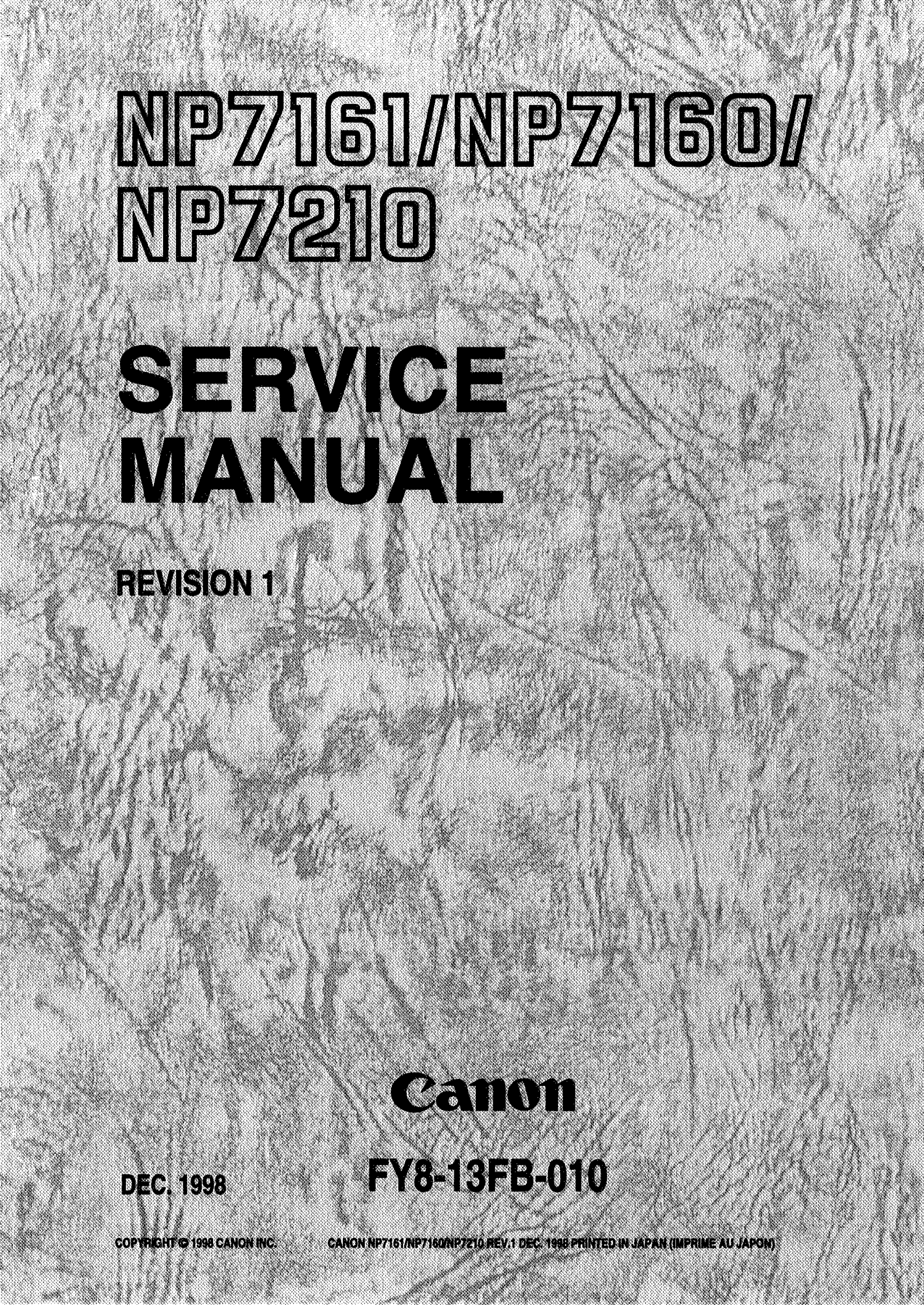

NP7161/NP7160/ NP7210

SERVICE MANUAL

REVISION 1

Canon

DEC. 1998

FY8-13FB-010

CANON NP7161/NP7160/NP7210 REV.1 DEC. 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

IMPORTANT

THIS DOCUMENTATION IS PUBLISHED BY CANON INC., JAPAN, TO SERVE AS A SOURCE OF REFERENCE FOR WORK IN THE FIELD.

SPECIFICATIONS AND OTHER INFORMATION CONTAINED HEREIN MAY VARY SLIGHTLY FROM ACTUAL MACHINE VALUES OR THOSE FOUND IN ADVERTISING AND OTHER PRINTED MATTER.

ANY QUESTIONS REGARDING INFORMATION CONTAINED HEREIN SHOULD BE DIRECTED TO THE COPIER SERVICE DEPARTMENT OF THE SALES COMPANY.

THIS DOCUMENTATION IS INTENDED FOR ALL SALES AREAS, AND MAY CONTAIN INFORMATION NOT APPLICABLE TO CERTAIN AREAS.

Printed in Japan
Imprimé au Japon

Use of this manual should be strictly supervised to avoid disclosure of confidential information.

Prepared by

OFFICE IMAGING PRODUCTS TECHNICAL SUPPORT DEPT. 1
OFFICE IMAGING PRODUCTS TECHNICAL SUPPORT DIV.

CANON INC.

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INTRODUCTION

This Service Manual contains basic facts and figures on the NP7161/NP7160/NP7210 needed to service the machine in the field.

This copier is designed to enable full automatic copying work, and comes with the following systems accessories:

1. ADF-G1*
2. Staper Sorter-L1*
3. MS-C1*
4. Cassette Feeding Module-C1

* Applies to the NP7161/NP7210 only.

This Service Manual covers the copier only, and consists of the following chapters:

Chapter 1	General Description introduces the copier's features and specifications, shows how to operate the copier, and explains how copies are made.
Chapter 2	Basic Operation provides outlines of the copier's various mechanical workings.
Chapter 3	Exposure System discusses the principles of operation used for the copier's lens drive unit and scanner drive unit. It also explains the timing at which these drive units are operated, and shows how they may be disassembled/assembled and adjusted.
Chapter 4	Image Formation System discusses the principles of how images are formed. It also explains the timing at which the various units involved in image formation are operated, and shows how they may be disassembled/assembled and adjusted.
Chapter 5	Pick-Up/Feeding System explains the principles used from when copy paper is picked up to when a copy is delivered in view of the functions of electrical and mechanical units and in relation to their timing of operation. It also shows how these units may be disassembled/assembled and adjusted.
Chapter 6	Fixing System explains the principles used to fuse toner images to transfer media in view of the functions of electrical and mechanical units and in relation to their timing of operation. It also shows how these units may be disassembled/assembled and adjusted.
Chapter 7	Externals/Auxiliary Mechanisms shows the copier's external parts, and explains the principles used for the copier's various control mechanisms in view of the functions of electrical and mechanical units and in relation to their timing of operation. It also shows how these units may be disassembled/assembled and adjusted.
Chapter 8	Cassette Feeding Module explains the principles used from when copy paper is picked up to when a copy is delivered in view of the functions of electrical and mechanical units and in relation to their timing of operation. It also shows how these units may be disassembled/assembled and adjusted.
Chapter 9	Installation introduces requirements for the site of installation, and shows how the copier may be installed using step-by-step instructions.

Chapter 10 Maintenance and Servicing provides tables of periodically replaced parts and consumables/durables and scheduled servicing charts.

Chapter 11 Troubleshooting provides tables of maintenance/inspection, standards/adjustments, and problem identification (image fault/malfunction).

Appendix contains a general timing chart and general circuit diagrams.

The following rules apply throughout this Service Manual:

1. Each chapter contains sections explaining the purpose of specific functions and the relationship between electrical and mechanical systems with reference to the timing of operation.

   In the diagrams, ▬▭▬▭▬ represents the path of mechanical drive—where a signal name accompanies the symbol ———► , the arrow indicates the direction of the electric signal.

   The expression "turn on the power" means flipping on the power switch, closing the front door, and closing the delivery unit door, which results in supplying the machine with power.

2. In the digital circuits, '1' is used to indicate that the voltage level of a given signal is "High," while '0' is used to indicate "Low." (The voltage value, however, differs from circuit to circuit.)

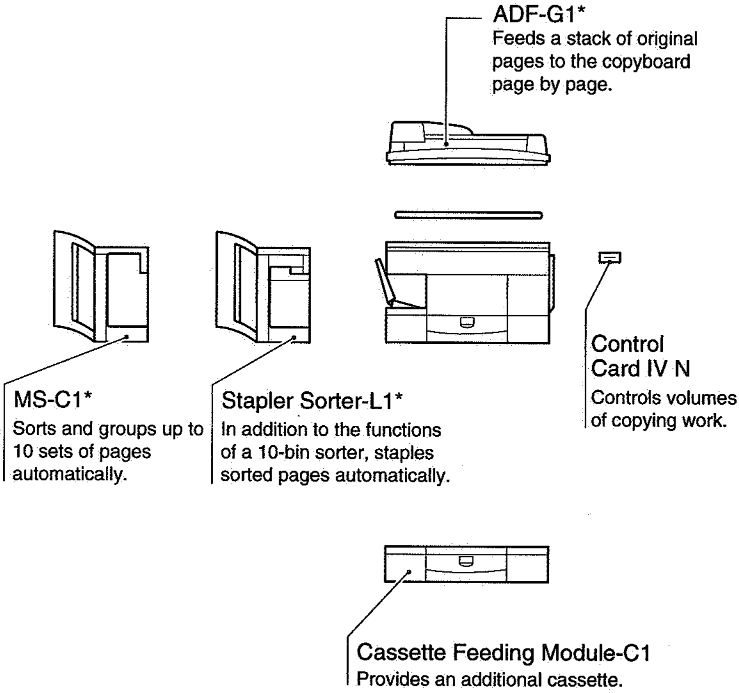
   In practically all cases, the internal mechanisms of a microprocessor cannot be checked in the field. Therefore, the operations of the microprocessors used in the machines are not discussed: they are explained in terms of from sensors to the input of the DC controller PCB and from the output of the DC controller PCB to the loads.

The descriptions in this Service Manual are subject to change without notice for product improvement or other purposes, and major changes will be communicated in the form of Service Information bulletins.

All service persons are expected to have a good understanding of the contents of this Service Manual and all relevant Service Information bulletins and be able to identify and isolate faults in the machine.

System Configuration

The copier is designed to accommodate the following accessories:
*Applies to the NP7161/NP7210 only.



ADF-G1*
Feeds a stack of original pages to the copyboard page by page.

MS-C1*
Sorts and groups up to 10 sets of pages automatically.

Stapler Sorter-L1*
In addition to the functions of a 10-bin sorter, staples sorted pages automatically.

Control Card IV N
Controls volumes of copying work.

Cassette Feeding Module-C1
Provides an additional cassette.

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CHAPTER 1

GENERAL DESCRIPTION

This chapter introduces the copier's features and specifications, shows how to operate the copier, and explains how copies are made.

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I. FEATURES

1. The copier is designed light in weight (about 42 kg, about 53.8kg*), and compact in size (566 mm wide, 541mm deep).
   * In case the Cassette Feeding Module installed.
2. Possible copying speed of 16 (21) copies/min. using A4/LTR size
   - Figures in brackets are NP7210 specifications.
3. The addition of the Cassette Feeding Module-C1 (accessory) enables a source of paper capable of holding a maximum of 1,050 sheets.
4. The density may be adjusted to 33 different shades, or in automatic mode (AE).
5. The use of a photo mode promises faithful reproduction of halftone.
6. The use of an auto power-off function promises power-saving operation.

II. SPECIFICATIONS

A. Copier

1. Type

Body	Desktop
Copyboard	Fixed
Light source	Halogen lamp (200W for 120V model ; 220W for 230V model)
Lens	Lens array
Photosensitive material	OPC (30 dia.)

2. Mechanisms

Copying		Indirect electrostatic
Charging		Corona
Exposure		Slit (moving light source)
Copy density adjustment		Auto or manual
Development		Dry (toner projection)
Pick-up	Auto	Front cassette (1 pc.)
		Front cassette (2 pcs.) *
	Manual	Multifeeder (5 mm deep approx.; about 50 sheets of 80 g/m^2 paper)
Transfer		Corona
Separation		Curvature + static eliminator
Cleaning		Blade
Fixing		Heat roller (1000 W for 120V model; 1050 W for 230V model)

* In case the Cassette Feeding Module installed.

3. Performance

Original type		Sheet, book, 3-D object (2 kg max.)
Maximum original size		A3/279 × 432 mm (11"×17")
Reproduction ratio	Direct	1:1.000
	Reduce I	1:0.5000
	Reduce II	1:0.707
	Reduce III	1:0.0816
	Reduce IV	1:0.0865
	Enlarge I	1:1.154
	Enlarge II	1:1.224
	Enlarge III	1:1.414
	Enlarge IV	1:2.000
	Zoom	1:0.500 to 2.000 (in 1% increments)
Wait time		30 sec or less (at 20°C room temperature)
First copy		5.8 sec or less (A4, Direct, non-AE, cassette)
Continuous copying		999 sheets max.
Copy size		A3/279×432 mm (11"×17") max. B5R/STMTR min.
Copy paper type	Cassette	• Plain paper (64 to 80 g/m^2) A3, B4, A4R, A4, B5R,B5, 279 × 432 mm (11"×17"), LTRR, LTR, LGL • Colored paper (recommended by Canon) B4, A4
	Multifeeder	• Plain paper (64 to 80 g/m^2) A3, B4, A4R, A4, B5R, B5, A5, 279X432 mm (11"×17"), LTRR, LTR, LGL, STMTR • Tracing paper (SM-1, GNT80) A3, B4, A4R, A4, B5R, B5, A5 • Transparency (recommended by Canon) A4/LTR • Colored paper (recommended by Canon)* B4, A4 • Label paper (recommended by Canon) A4/LTR • Heavy paper (up to 128 g/m^2)

*May be used, but may not feed properly.

Cassette	Claws	Used
	Frame	55 mm deep (500 sheets of 80 g/m^2 paper; 250 sheets if B5)
Copy tray		100 sheets approx. (plain paper ; 64 to 80 g/m^2)
Non-image width	Leading edge	Direct 2.0 ±1.0 mm
	Trailing edge	Direct 2.5 ±1.5 mm
	Left/right	Direct 2.5 ±2.0 mm
Auto clear		Provided (2 min standard; may be changed between 1 and 9 min in 1-min increments)
Auto power-off		Provided (30 min standard; may be changed between 10 and 90 min in 10-min increments)
Auto pre-heat		Provided (15 min standard; may be changed between 15 and 90 min in 15-min increments)
Accessories		• ADF-G1* • MS-C1* • Control Card IV N • Cassette Feeding Module-C1 • Stapler Sorter-L1* • Remote Diagnostic Device II

*Applies to the NP7161/NP7210 only.

4. Others

Operating conditions	Temperature	7.5° to 32.5°C/45.5° to 90.5°F		
	Humidity	5% to 80% RH		
	Atmospheric pressure	810.6 to 1013.3 hPa (0.8 to 1.0 atm)		
Power source		NP7160	NP7161	NP7210
	120V 120V 120V (UL) 127V 230V 230V 230V	NLB xxxxx ---- ---- NLC xxxxx PHQ xxxxx ---- ----	---- ---- NLD xxxxx ---- PHS xxxxx RCU xxxxx PHU xxxxx	NML xxxxx NNM xxxxx ---- ---- PKT xxxxx PKV xxxxx PKW xxxxx
Power consumption	Maximum	1.5 kW or less		
	Standby	0.125 kWh (approx.; reference		
	Continuous	0.645 kWh (approx.; reference		
Noise	Copying	NP7160/NP7161 : 66 dB or less (sound power level by ISO meth		
	Standby	40 dB or less (sound power leve		
Ozone (8-hr average)		0.05 ppm or less		
Dimensions	Width	566 mm/22.3 in (566 mm/22.3 i		
	Depth	541 mm/21.3 in (541 mm/21.3 i		
	Height	389 mm/15.3 in (526 mm/20.7 i		
Weight		Approx. 42 kg/92.6 lb (Approx.		
Consumables	Copy paper	Keep wrapped, and avoid humic		
	Toner	Avoid direct sunlight, and store		

only)

only)

s NP7210 : 67.5 dB or less
hod)

el by ISO method)

n)*1

n)*1

n)*1

53.8 kg/118.5 lb)*1

dity.

at 40°C, 85% or less.

*1 In case Cassette Feeding Module installed.

Specifications subject to change witho

out notice.

Reproduction mode		Size	Copy paper	Copies/min	
				NP7161/NP7160	NP7210
Direct	(100%)	A3 (297 × 420mm)	A3	9	11
		A4 (297 × 210mm)	A4	16	21
		B4 (257 × 364mm)	B4	11	13
		B5 (257 × 182mm)	B5	17	21
		A4R (210 × 297mm)	A4R	13	16
		B5R (182 × 257mm)	B5R	14	17
Reduce	I (70.7%)	A3 → A4R	A4R	11	14
		B4 → B5R	B5R	13	17
	Ⅱ (81.6%)	B4 → A4R	A4R	12	15
	Ⅲ (86.5%)	A3 → B4	B4	10	13
		A4 → B5	B5	17	21
Enlarge	I (200%)	A5R → A3	A3	8	10
	Ⅱ (141.4%)	A4R → A3	A3	8	11
		B5R → B4	B4	9	13
	Ⅲ (122.4%)	A4R → B4	B4	9	13
	Ⅳ (115.4%)	B4 → A3	A3	8	11
		B5 → A4	A4	11	21

Specifications subject to change without notice.

Reproduction mode		Size	Copy paper	Copies/min	
				NP7161/NP7160	NP7210
Direct	(100%)	11" × 17" (279 × 432mm)	11" × 17"	9	11
		LTR (297 × 216mm)	LTR	16	21
		LGL (216 × 356mm)	LGL	11	13
		LTRR (216 × 297mm)	LTRR	13	16
Reduce	I (64.7%)	11" × 17" → LTRR	LTRR	12	15
	II (73.3%)	11" × 17" → LGL	LGL	11	13
	III (78.6%)	LGL → LTRR	LTRR	12	15
Enlarge	I (200%)	STMTR → 11" × 17"	11" × 17"	8	10
	II (129.4%)	LTRR → 11" × 17"	11" × 17"	8	11
	III (121.4%)	LGL → 11" × 17"	11" × 17"	8	13

Specifications subject to change without notice.

B. Cassette Feeding Module-C1

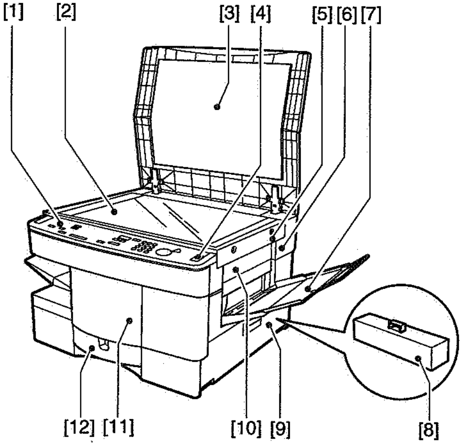
Item	Specifications
Type of Paper	Corresponding to copier model
Cassette Specifications	Corresponding to copier model
Power supply	24V DC, 5V DC (supplied from copier)
Dimensions	563(W) x 541(D) x 166(H) mm/22.1(W) x 21.3(D) x 6.5(H) in.
Weight	Approx. 11.2 kg/24.7 lb

Specifications subject to change without notice.

III. NAMES OF PARTS

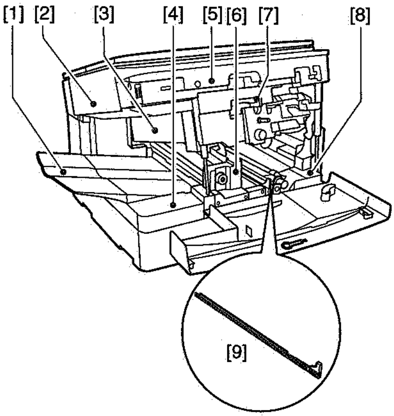
A. External View

1. Copier



[1] Control panel
[2] Copyboard glass
[3] Copyboard cover
[4] Power switch
[5] Upper right cover
[6] Upper rear cover
[7] Multifeeder
[8] Waste toner box
[9] Right door
[10] Right cover
[11] Front door
[12] Cassette

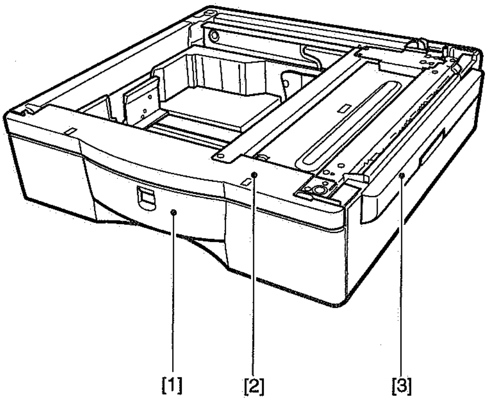
Figure 1-301



[1] Copy tray
[2] Upper left cover
[3] Upper delivery cover
[4] Lower delivery cover
[5] Front fixing cover
[6] Inside cover
[7] Open/close lever
[8] Lower inside cover
[9] Static eliminator

Figure 1-302

2. Cassette Feeding Module

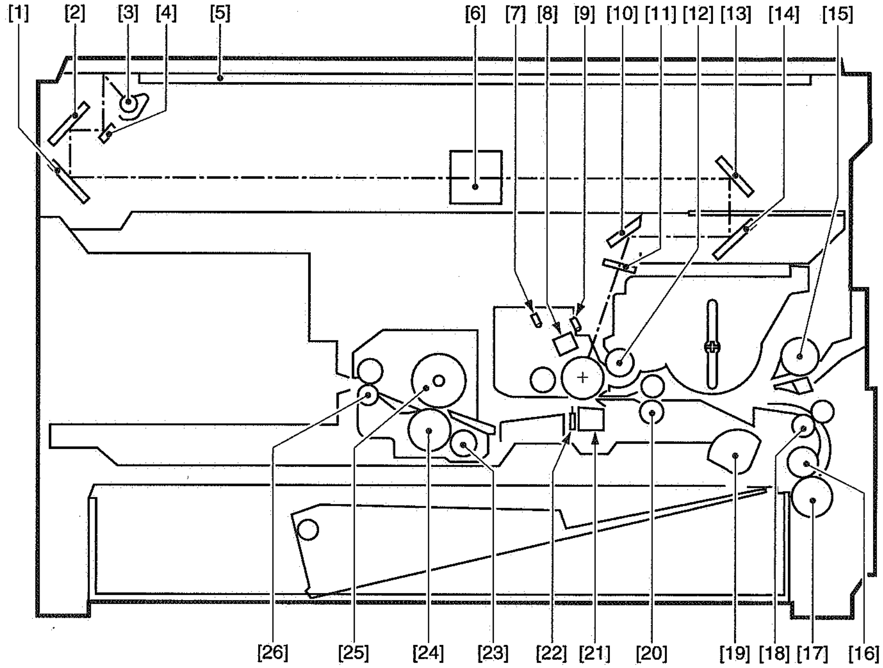


[1] Cassette
[2] Front upper cover
[3] Right door

Figure 1-303

B. Cross Section

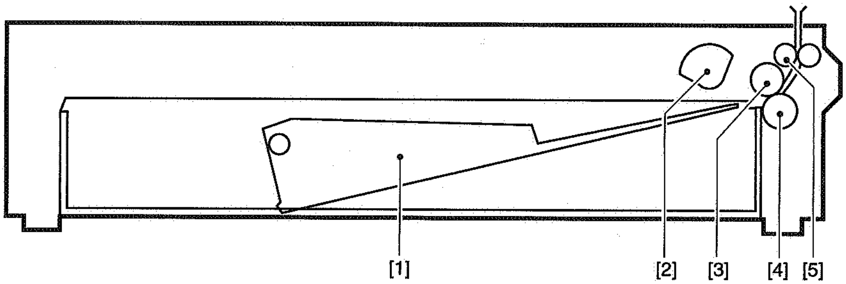
1. Copier



[1]	No. 3 mirror
[2]	No. 2 mirror
[3]	Scanning lamp
[4]	No. 1 mirror
[5]	Copyboard glass
[6]	Lens
[7]	Pre-exposure lamp
[8]	Primary charging assembly
[9]	Blank exposure lamp
[10]	No. 6 mirror
[11]	Dust-proofing glass
[12]	Developing cylinder
[13]	No. 4 mirror
[14]	No. 5 mirror
[15]	Multifeeder pick-up roller
[16]	Feed roller
[17]	Separation roller
[18]	Vertical path roller
[19]	Pick-up roller
[20]	Registration roller
[21]	Transfer charging assembly
[22]	Separation static eliminator
[23]	Heat discharging roller
[24]	Lower fixing roller
[25]	Upper fixing roller
[26]	Delivery roller

Figure 1-304

2. Cassette Feeding Module



[1]	Cassette
[2]	Pick-up roller
[3]	Feed roller
[4]	Separation roller
[5]	Vertical path roller

Figure 1-305

IV. OPERATING THE MACHINE

A. Control Panel

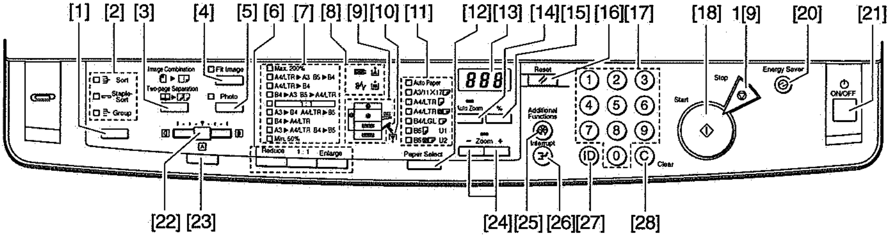

[1]
[2]
[3]
[4]
[5]
[6]
[7]
[8]
[9]
[10]
[11]
[12]
[13]
[14]
[15]
[16]
[17]
[18]
1[9]
[20]
[21]
[22]
[23]
[24]
[25]
[26]
[27]
[28]
Sort
Staple-Sort
Group
Image Combination
Two-page Separation
Fit Image
Photo
Reduce
1:1
Enlarge
Auto Paper
Paper Select
888
Auto Zoom
%
Zoom
Reset
Additional Functions
Interrupt
Clear
Start
Stop
Energy Saver
ON/OFF

Figure 1-401

Ref.	Name	Description	Remarks
[1]	Sorter key*	Press it to select or deselect Sort, Staple Sort, or Group Sort mode.	*Requires a sorter or stapler sorter.
[2]	Sorter indicator*	Indicates the selected delivery mode. It remains off in non-sort mode.	
[3]	2-on-1*/Page Separate key	Press it to select or deselect 2-on-1 or Page Separate mode.	*Requires an ADF.
[4]	Fit Page key	Press to select or deselect Fit Page mode. Use the mode to make a copy covering all image area of the original.	
[5]	Photo key	Press it to select or deselect Photo mode.	
[6]	Reduce/Direct/ Enlarge key	Press it to select Reduce/Enlarge (default ratio) or reset any ratio to Direct.	
[7]	Default Ratio indicator	Indicates the selected default reproduction ratio.	
[8]	Control Card indicator	Flashes when the control card is not set properly.	Requires a Control Card Unit.
	Jam indicator	Flashes when a jam occurs.	
	Toner indicator	Flashes when toner is running out. It stops flashing and remains on when toner runs out completely.	
	Paper indicator	Flashes if paper runs out in the selected cassette or the manual feed tray (or, when the cassette is not set properly).	
[9]	Paper Source/Jam	Indicates the selected cassette or the manual tray; flashes the location of a jam, if any. (It also flashes when a jam occurs in the ADF or when the sorter or the right door needs to be checked.)	

* Applies to the NP7161/NP7210 only

Table 1-401

Ref.	Name	Description	Remarks
[10]	Location indicator	Flashes when the waste toner box needs to be replaced. When the case becomes full, it stops flashing and remains on.	
[11]	Paper Size indicator	Indicates the size of the paper in the cassette selected by the Paper Select key.	
[12]	Paper Select key	Press it to select Auto Paper Select*, Cassette, or Manual Feed Tray mode.	*Requires an ADF.
[13]	Copy Count/Ratio indicator	Indicates the copy count/ratio and the selected user mode.	
[14]	Auto Ratio key*	Use it to select or deselect Auto Ratio mode, in which the best reproduction ratio is automatically selected to suit the original and the selected paper.	*Requires an ADF.
[15]	% key	Press it to indicate the selected reproduction ratio.	
[16]	Reset key	Use it to reset the current copy mode to default.	
[17]	Keypad	Use it to set a copy count or to enter a numeric value.	
[18]	Start key	Press it to start copying.	
[19]	Stop key	Press it to stop continuous copying.	
[20]	Power Save key	Press it to select or deselect power save mode.	
[21]	Power switch	Press it to turn on or off the power.	
[22]	Copy Density lever	Slide it to adjust the copy density manually.	
[23]	AE key	Press it to select or deselect AE (auto density adjustment) mode.	
[24]	Zoom key	Press it to select a reproduction ratio (50% to 200%) in 1% increments. Hold it down to increase/decrease the ratio continuously.	
[25]	User Mode key	Press it to set or change user mode settings.	
[26]	Interrupt key	Press it to stop an ongoing copying run to make a copy of a different original.	
[27]	ID key	Press it after entering an appropriate ID number. Press it also after entering a number for ID registration.	
[28]	Clear key	Press it to reset the copy count to 1 or to clear any wrong input when making settings.	

* Applies to the NP7161/NP7210 only

Table 1-402

B. User Mode

1. Outline

The copier provides user modes, which may be changed freely by the user. These modes provide the functions shown in the following table.

<table>
<tr><th>Notation</th><th>Item</th><th>Description</th><th>Factory settings (default)</th></tr>
<tr><td>U00</td><td>Resetting user mode</td><td>Use it to reset new settings made in user mode to default settings.</td><td>–</td></tr>
<tr><td rowspan="2">U01</td><td>Changing auto clear time</td><td>Use it to set the auto clear time length between 1 an 9 min in 1-min increments. Setting it to 0 disables the auto-clear function.</td><td rowspan="2">2 min</td></tr>
<tr><td colspan="2"><table>
<tr><td>Auto Clear time (min.)</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr>
<tr><td>Inputs</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr>
</table></td></tr>
<tr><td rowspan="2">U02</td><td>Changing auto power-save time</td><td>Use it to select an appropriate auto power-save time length: 10, 15, 20, 30, 40, 50, 60, or 90 min (8 lengths).</td><td rowspan="2">15 min</td></tr>
<tr><td colspan="2"><table>
<tr><td>Auto power save time (min.)</td><td>10</td><td>15</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>90</td></tr>
<tr><td>Inputs</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr>
</table></td></tr>
<tr><td rowspan="2">U03</td><td>Changing auto power-off time</td><td>Use it to select an appropriate auto power-off time length: 10, 15, 20, 30, 40, 50, 60, 90 (8 lengths).</td><td rowspan="2">30 min</td></tr>
<tr><td colspan="2"><table>
<tr><td>Auto power off time (min.)</td><td>10</td><td>15</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>90</td></tr>
<tr><td>Inputs</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr>
</table></td></tr>
<tr><td rowspan="2">U04</td><td>Fine-adjusting Zoom</td><td>Use it to adjust vertical and horizontal reproduction ratios over ±5 grades in 0.2% increments.
Rang: -1.0% to +1.0% in units of 0.2%</td><td rowspan="2">±0.0%</td></tr>
<tr><td colspan="2"><table>
<tr><td>Adjustment directions</td><td>X direction</td><td>X direction</td></tr>
<tr><td>Inputs</td><td>1</td><td>2</td></tr>
</table>
Fine-adjustment Zoom press the zoom (±) key.
<table>
<tr><td>Settings (%)</td><td>-1.0</td><td>-0.8</td><td>-0.6</td><td>-0.4</td><td>-0.2</td><td>0</td><td>0.2</td><td>0.4</td><td>0.6</td><td>0.8</td><td>1.0</td></tr>
<tr><td>displayed</td><td>-10</td><td>-8</td><td>-6</td><td>-4</td><td>-2</td><td>0</td><td>2</td><td>4</td><td>6</td><td>8</td><td>10</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Notation</th><th>Item</th><th>Description</th><th>Factory settings (default)</th></tr>
<tr><td rowspan="2">U05</td><td>Turning on/off auto cassette change</td><td>Use it to turn on/off the auto cassette change function, in which copying is continued by switching cassettes when the selected cassette runs out of paper.
ON : Enable auto cassette change.
OFF : Disable auto cassette change.</td><td rowspan="2">ON</td></tr>
<tr><td colspan="2"><table><tr><td>Auto cassette change</td><td>ON</td><td>OFF</td></tr><tr><td>Inputs</td><td>1</td><td>0</td></tr></table></td></tr>
<tr><td rowspan="2">U06</td><td>Turning on/off auto sort</td><td>Use it to turn on/off the auto sort function, in which sorting takes place when making multiple copies of multiple originals using an ADF.
ON : Enable auto sort.
OFF : Disable auto sort.</td><td rowspan="2">ON</td></tr>
<tr><td colspan="2"><table><tr><td>Auto sort</td><td>ON</td><td>OFF</td></tr><tr><td>Inputs</td><td>1</td><td>0</td></tr></table></td></tr>
<tr><td rowspan="2">U07</td><td>Turning on/off ADF jam recovery</td><td>Use it to turn on/off auto counting of originals in ADF jam recovery.
ON : Enable auto count.
OFF : Disable auto count.</td><td rowspan="2">OFF</td></tr>
<tr><td colspan="2"><table><tr><td>ADF jam recovery</td><td>ON</td><td>OFF</td></tr><tr><td>Inputs</td><td>1</td><td>0</td></tr></table></td></tr>
<tr><td>U08</td><td>Cleaning feeder</td><td>Use it to clean the feeder (after placing paper in the ADF and pressing the Start key).</td><td>–</td></tr>
<tr><td rowspan="2">U09</td><td>Changing Page Fit mode (ratio)</td><td>Use it to change the reproduction ratio used in Page Fit mode between 90% and 99% in 1% increments.</td><td rowspan="2">93%</td></tr>
<tr><td colspan="2"><table><tr><td>Page fit mode (ratio:%)</td><td>90</td><td>91</td><td>92</td><td>93</td><td>94</td><td>95</td><td>96</td><td>97</td><td>98</td><td>99</td></tr><tr><td>Inputs</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr></table></td></tr>
</table>

<table>
<tr><th>Notation</th><th>Item</th><th>Description</th><th>Factory settings (default)</th></tr>
<tr><td rowspan="2">U10</td><td>Changing Page Fit mode (centering)</td><td>Use it to turn on/off the centering function in Fit Page mode.
O N : Enable centering.
OFF : Disable centering.</td><td rowspan="2">ON</td></tr>
<tr><td colspan="2"><table><tr><td>Page fit mode (centering)</td><td>ON</td><td>OFF</td></tr><tr><td>Inputs</td><td>1</td><td>0</td></tr></table></td></tr>
<tr><td rowspan="2">U11</td><td>Changing Page Fit mode (non-image width)</td><td>Use it to turn on/off the non-image width function in Page Fit mode.
O N : Enable (create non-image width).
OFF : Disable (do not create non-image width).</td><td rowspan="2">OFF</td></tr>
<tr><td colspan="2"><table><tr><td>Page fit mode (non-image width)</td><td>ON</td><td>OFF</td></tr><tr><td>Inputs</td><td>1</td><td>0</td></tr></table></td></tr>
<tr><td>U12</td><td>Correcting density</td><td>Use it to select an appropriate standard value (F5) for manual density adjustment between -17 and +6 (24 grades).</td><td>0</td></tr>
<tr><td>U13</td><td>Setting special paper mode</td><td>Use it to select an appropriate fixing temperature control mode for special paper when pick-up is from the multifeeder.
0: Standard
1: Rough surface paper (against poor fixing)
2: Tracing paper (against high-temperature offset)</td><td>0</td></tr>
<tr><td rowspan="2">U14*</td><td>Drum cleaning mode</td><td>Use it to turn ON/OFF the drum cleaning function.
To remove dirt from the surface of the photosensitive drum, toner is deposited on the surface after copying operation and the cleaning blade is used to collect the toner</td><td rowspan="2">OFF</td></tr>
<tr><td colspan="2"><table><tr><td>Drum cleaning mode</td><td>ON</td><td>OFF</td></tr><tr><td>Inputs</td><td>1</td><td>0</td></tr></table></td></tr>
</table>

* If the drum cleaning settings in service mode No. 519 is turned ON.

V. ROUTINE MAINTENANCE (BY THE USER)

Instruct the user to clean the following parts at least once a week.

1. Copyboard Glass
   Wipe with a moist cloth (moistened with water or mild detergent solution); then, dry wipe.
2. Copyboard Cover
   Wipe it with a moist cloth (moistened with water or mild detergent solution); then, dry wipe.
3. Primary Charging Assembly
   Pull out and then push in the wire cleaner several times to clean the charging wire.
4. Transfer Charging Assembly
   Pull out and then push in the wire cleaner several times to clean the charging wire.
5. Static Eliminator
   If separation jams occur frequently, clean the static eliminator using the special brush. (Cleaning need not be as often as every week.)
6. Waste Toner Box
   If the Waste Toner Box indicator on the control panel flashes or turns on, replace the waste toner box.

VI. POINTS TO NOTE (BY THE USER)

- Toner Cartridge
  Instruct the user to dispose of any used (empty) toner cartridge according to governmental guidelines.
- Waste Toner Box
  Instruct the user to keep any waste toner box for collection during a servicing visit.

⚠ Caution:
Do not dispose of the toner cartridge or the waste toner box into fire. Toner can catch fire, causing implosion or explosion.

VII. IMAGE FORMATION

A. Outline

The copier is constructed as shown in Figure 1-701.

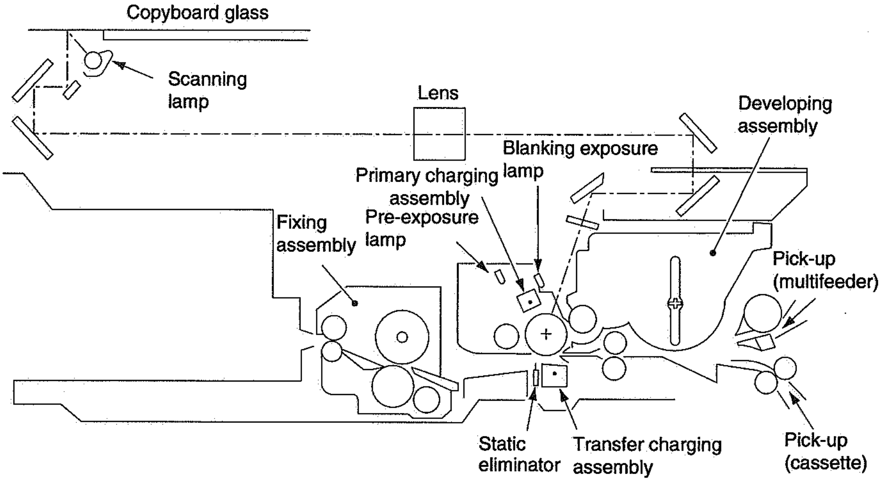

Copyboard glass
Scanning lamp
Lens
Developing assembly
Blanking exposure lamp
Primary charging assembly
Fixing assembly
Pre-exposure lamp
Pick-up (multifeeder)
Static eliminator
Transfer charging assembly
Pick-up (cassette)

Figure 1-701

The copier's image formation processes consist of the following eight steps:

Step 1 Pre-exposure
Step 2 Primary charging (negative DC)
Step 3 Image exposure
Step 4 Development (AC + negative DC)
Step 5 Transfer (negative DC)
Step 6 Separation (curvature + static eliminator)
Step 7 Fixing
Step 8 Drum cleaning

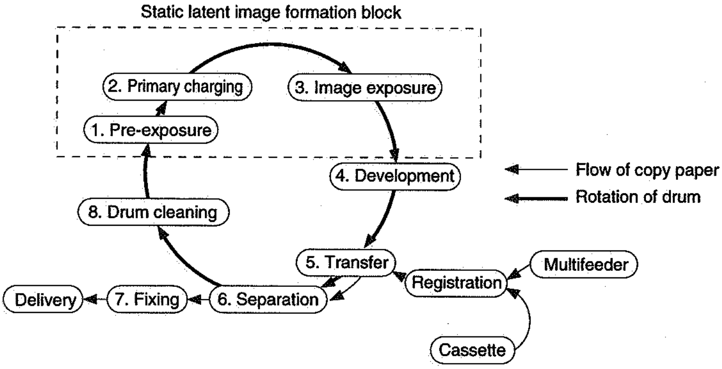

Static latent image formation block
2. Primary charging
3. Image exposure
1. Pre-exposure
4. Development
Flow of copy paper
Rotation of drum
8. Drum cleaning
5. Transfer
Multifeeder
Registration
Delivery
7. Fixing
6. Separation
Cassette

Figure 1-702

CHAPTER 2

BASIC OPERATION

This chapter provides outlines of the copier's various mechanical workings.

Process speed	105 mm/sec

I. BASIC MECHANISMS 2-1
  A. Functional Construction 2-1
  B. Outline of the Electrical Circuitry........ 2-2
  C. Basic Sequence of Operations 2-4
  D. Main Motor (M1) Control Circuitry...... 2-8
  E. Inputs to the DC Controller 2-9
  F. Outputs from the DC Controller 2-12
  G. Inputs to and Outputs from Accessories (1/1) 2-16

I. BASIC MECHANISMS

A. Functional Construction

The copier can broadly be divided into the following four functional blocks: pick-up, feeding, exposure, image formation, and control.

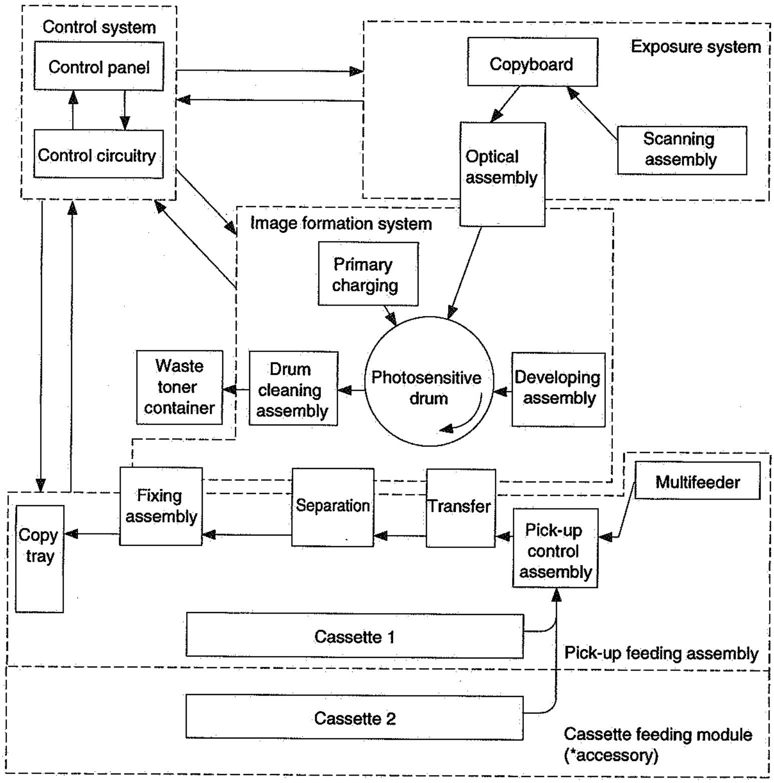

Control system
Control panel
Control circuitry
Exposure system
Copyboard
Optical assembly
Scanning assembly
Image formation system
Primary charging
Photosensitive drum
Developing assembly
Drum cleaning assembly
Waste toner container
Fixing assembly
Separation
Transfer
Multifeeder
Pick-up control assembly
Copy tray
Cassette 1
Pick-up feeding assembly
Cassette 2
Cassette feeding module (*accessory)

Figure 2-101

B. Outline of the Electrical Circuitry

The copier's major electrical mechanisms are controlled by the microprocessor on the DC controller PCB. The ICs on the DC controller PCB are shown below.

IC121 (ROM)
- Controls copying sequence.

JC113 (gate array)
- Controls scanning lamp (LA1) error detection.
- Controls thermistor (TH1, TH2) error detection.
- Controls triac short circuit error detection.
- Controls power at time of error.
- Turns on/off the scanning lamp (LA3).
- Controls the I/O port.

IC114 (IPC; NP7161/NP7210 only)
- Controls communication with the ADF and the sorter.

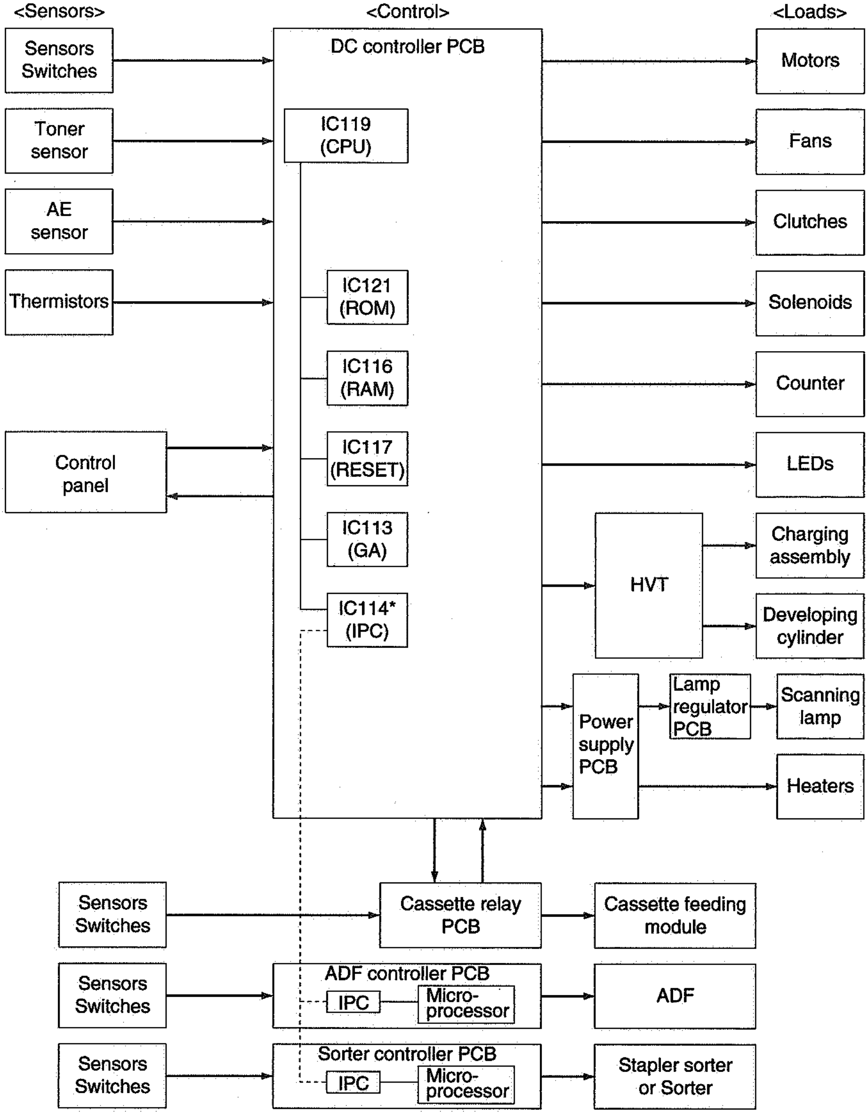
JC116 (RAM)
- Records settings data (service mode, etc.).

IC117 (RESET IC)
- Resets at power-on.

Figure 2-102 is a block diagram showing the relationship between the copier's major circuits.

Reference:

The NP7161/NP7210 possesses a communications IC (IPC) on its DC controller PCB. The copier communicates with the ADF and the sorter using the communications IC on each controller PCB (IPC communication) and the communications PCB on the DC controller PCB (IPC communication 2).


<Sensors>
<Control>
<Loads>
Sensors Switches
Toner sensor
AE sensor
Thermistors
Control panel
DC controller PCB
IC119 (CPU)
IC121 (ROM)
IC116 (RAM)
IC117 (RESET)
IC113 (GA)
IC114* (IPC)
Motors
Fans
Clutches
Solenoids
Counter
LEDs
HVT
Charging assembly
Developing cylinder
Power supply PCB
Lamp regulator PCB
Scanning lamp
Heaters
Sensors Switches
Cassette relay PCB
Cassette feeding module
Sensors Switches
ADF controller PCB
IPC
Micro-processor
ADF
Sensors Switches
Sorter controller PCB
IPC
Micro-processor
Stapler sorter or Sorter

*NP7161/NP7210 only

Figure 2-102

C. Basic Sequence of Operations

1. Basic Sequence of Operations at Power-On

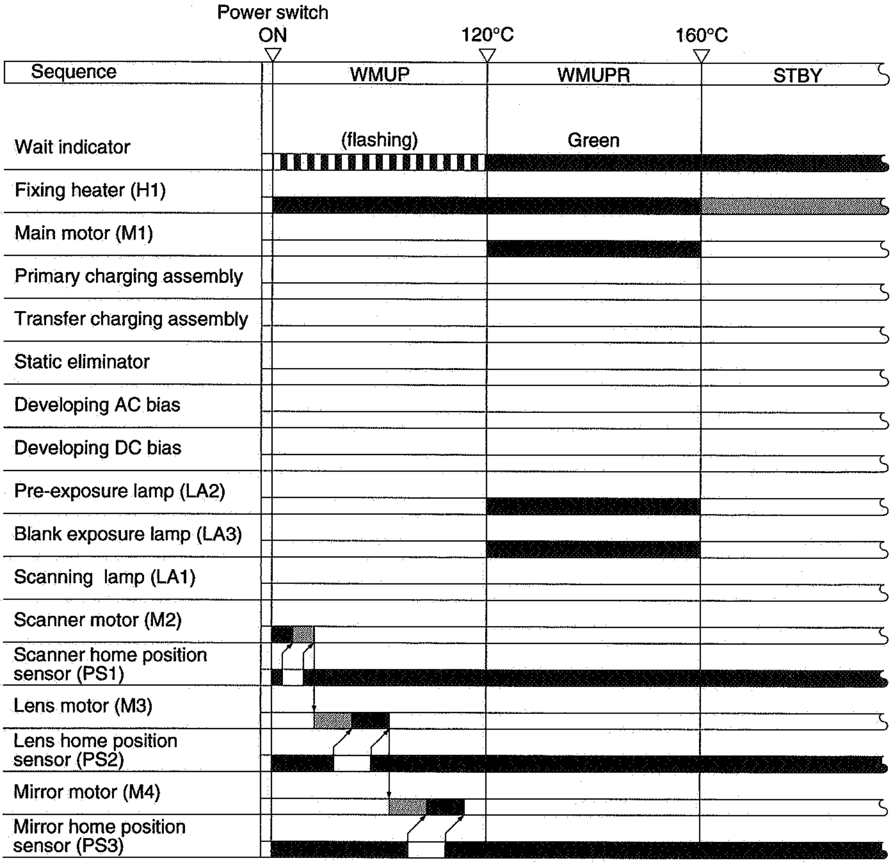

Power switch ON
120°C
160°C
Sequence
WMUP
WMUPR
STBY
Wait indicator
(flashing)
Green
Fixing heater (H1)
Main motor (M1)
Primary charging assembly
Transfer charging assembly
Static eliminator
Developing AC bias
Developing DC bias
Pre-exposure lamp (LA2)
Blank exposure lamp (LA3)
Scanning lamp (LA1)
Scanner motor (M2)
Scanner home position sensor (PS1)
Lens motor (M3)
Lens home position sensor (PS2)
Mirror motor (M4)
Mirror home position sensor (PS3)

Figure 2-103

Period		Description	Remarks
WMUP (warm-up)	From when the power switch is turned on until the surface temperature of the upper fixing roller reaches 120°C.	Waits until the upper fixing roller warms up.	Moves the lens, mirror, and scanner to home position.
WMUPR (warm-up rotation)	From when WMUP ends until the surface temperature of the upper fixing roller reaches 160°C.	• Evens out the surface temperature of the upper fixing roller. • Stirs the toner inside the developing assembly. • Discharges copy paper, if any, inside the copier.	Starts copying operation when the surface temperature of the upper fixing roller reaches 140°C (NP7161/NP7160)/155°C (NP7210) if Auto Start has been selected.
STBY (standby)	From when WMUPR ends until the Copy Start key is pressed. Or, from when LSTR ends until the power switch is turned off.	Waits for a press on an operation key (Start key, etc.).	Turns on Auto Clear if no operation key is pressed (i.e., resets to standard mode after a specific period of time).

Table 2-101

2. Basic Sequence of Operations at Copy Start

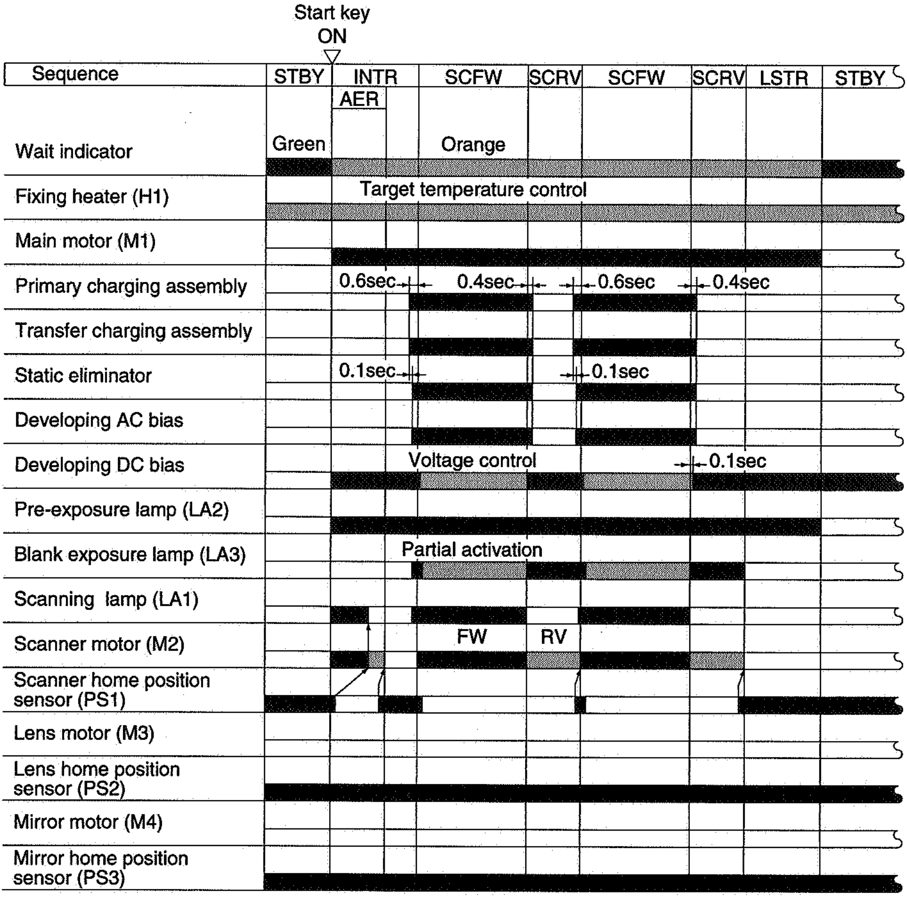


Figure 2-104

Period		Description	Remarks
INTR (initial rotation)	From when the Start key is pressed until the scanner starts to move forward.	Stabilizes the drum sensitivity in preparation for copying operation.	
AER (AE rotation)	From when the Start key is pressed until the scanner finishes measuring densuty.	Measures the density of the original while the scanner is moving forward.	Used only in AE mode.
SCFW (scanner forward)	While the scanner is moving forward.	Uses the scanning lamp to shine the original, and directs the reflected optical image to the photosensitive drum by way of mirrors and lenses.	Generates the registration signal, and moves the copy paper to the transfer assembly.
SCRV (scanner reverse)	While the scanner is moving in reverse.	Returns the scanner to home position in preparation for the next copying operation.	
LSTR (last rotation)	From when SCRV ends until the main motor stops.	Rids the surface of the photosensitive drum of charges (surface potential) as post-copying operation.	Discharges the last copy.

Table 2-102

D. Main Motor (M1) Control Circuitry

1. Outline

Figure 2-105 shows the circuit used to control the main motor (M1), and the circuit has the following functions:

- Turning on and off the main motor.
- Controlling the rotation of the main motor.

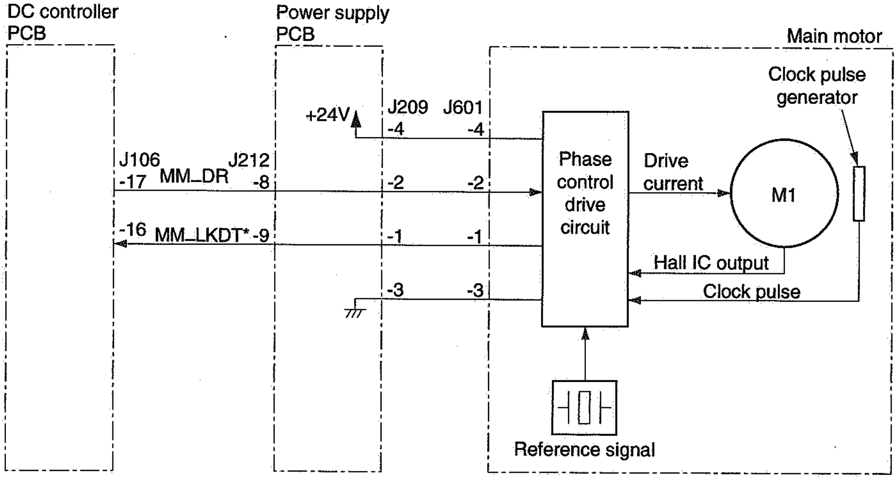

DC controller PCB
Power supply PCB
Main motor
Clock pulse generator
+24V
J209
J601
-4
-4
J106
J212
-17
MM_DR
-8
-2
-2
-16
MM_LKDT*
-9
-1
-1
-3
-3
Phase control drive circuit
Drive current
M1
Hall IC output
Clock pulse
Reference signal

Figure 2-105

2. Operation

The main motor is a DC motor equipped with a built-in clock pulse generator, which generates clock pulses according to the rotation of the motor while the motor rotates. The phase control drive circuit matches the phases of the clock pulses and the reference signals to control the rotation of the main motor.

When the main motor drive signal (MM_DR) from the DC controller PCB goes '1', the phase control drive circuit turns on, thereby rotating the main motor at a specific speed.

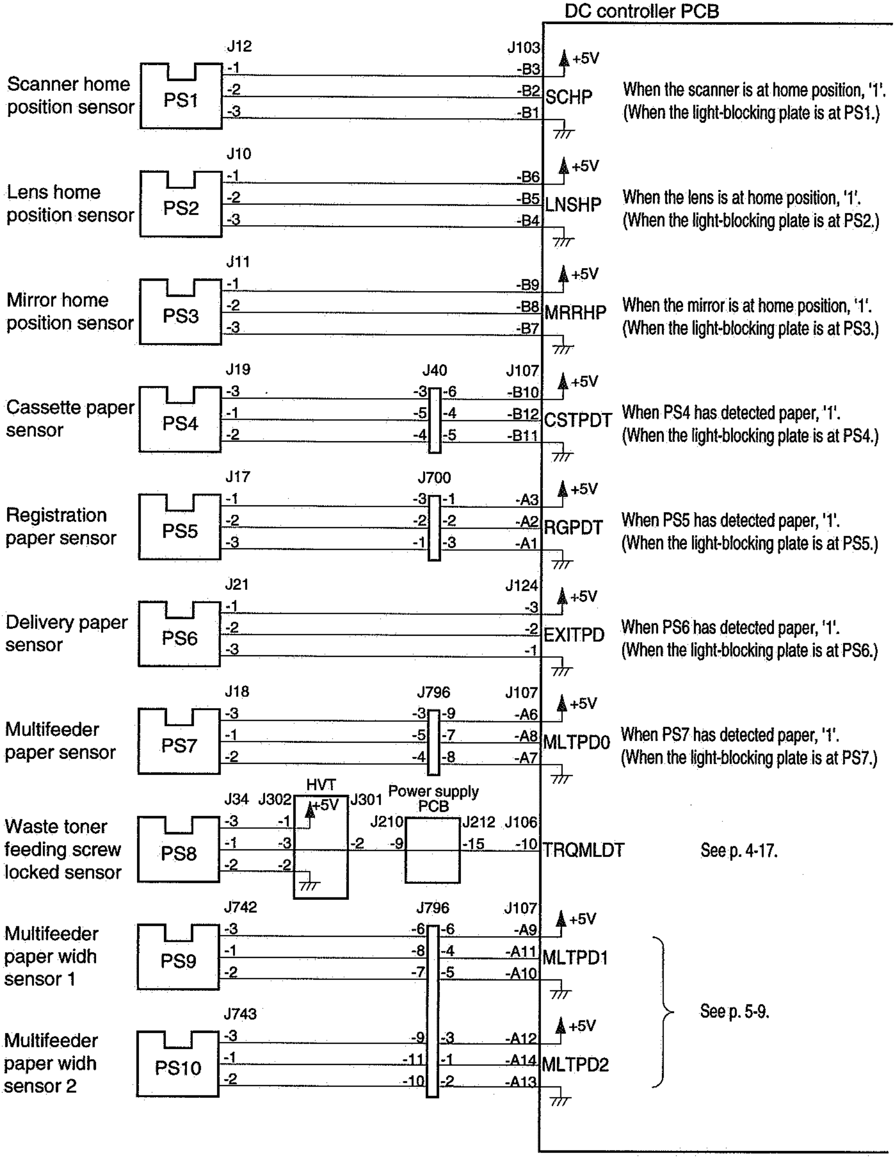
3. Detecting an Error

The phase control drive circuit sends the main motor lock detection signal (MM_LKDT*)=0 to the DC controller PCB as long as the main motor is rotating at a constant speed. If the rotation of the main motor becomes irregular for some reason, MM_LKDT* goes '1'.

If MM_LKDT*=1 continues for 1 sec or more when MM_DR is '1', the DC controller PCB will identify the condition as a main motor error, and will immediately stop the main motor and indicate "E010" on the control panel.

E. Inputs to the DC Controller

1. Inputs to the DC Controller (1/3)


DC controller PCB
Scanner home position sensor
PS1
J12
-1
-2
-3
J103
-B3
-B2
-B1
+5V
SCHP
Lens home position sensor
PS2
J10
-B6
-B5
-B4
LNSHP
Mirror home position sensor
PS3
J11
-B9
-B8
-B7
MRRHP
Cassette paper sensor
PS4
J19
J40
J107
-B10
-B12
-B11
CSTPDT
Registration paper sensor
PS5
J17
J700
-A3
-A2
-A1
RGPDT
Delivery paper sensor
PS6
J21
J124
EXITPD
Multifeeder paper sensor
PS7
J18
J796
J107
-A6
-A8
-A7
MLTPD0
Waste toner feeding screw locked sensor
PS8
J34
J302
HVT
J301
Power supply PCB
J210
J212
J106
-15
-10
TRQMLDT
Multifeeder paper widh sensor 1
PS9
J742
J796
J107
-A9
-A11
-A10
MLTPD1
Multifeeder paper widh sensor 2
PS10
J743
-A12
-A14
-A13
MLTPD2

When the scanner is at home position, '1'.
(When the light-blocking plate is at PS1.)

When the lens is at home position, '1'.
(When the light-blocking plate is at PS2.)

When the mirror is at home position, '1'.
(When the light-blocking plate is at PS3.)

When PS4 has detected paper, '1'.
(When the light-blocking plate is at PS4.)

When PS5 has detected paper, '1'.
(When the light-blocking plate is at PS5.)

When PS6 has detected paper, '1'.
(When the light-blocking plate is at PS6.)

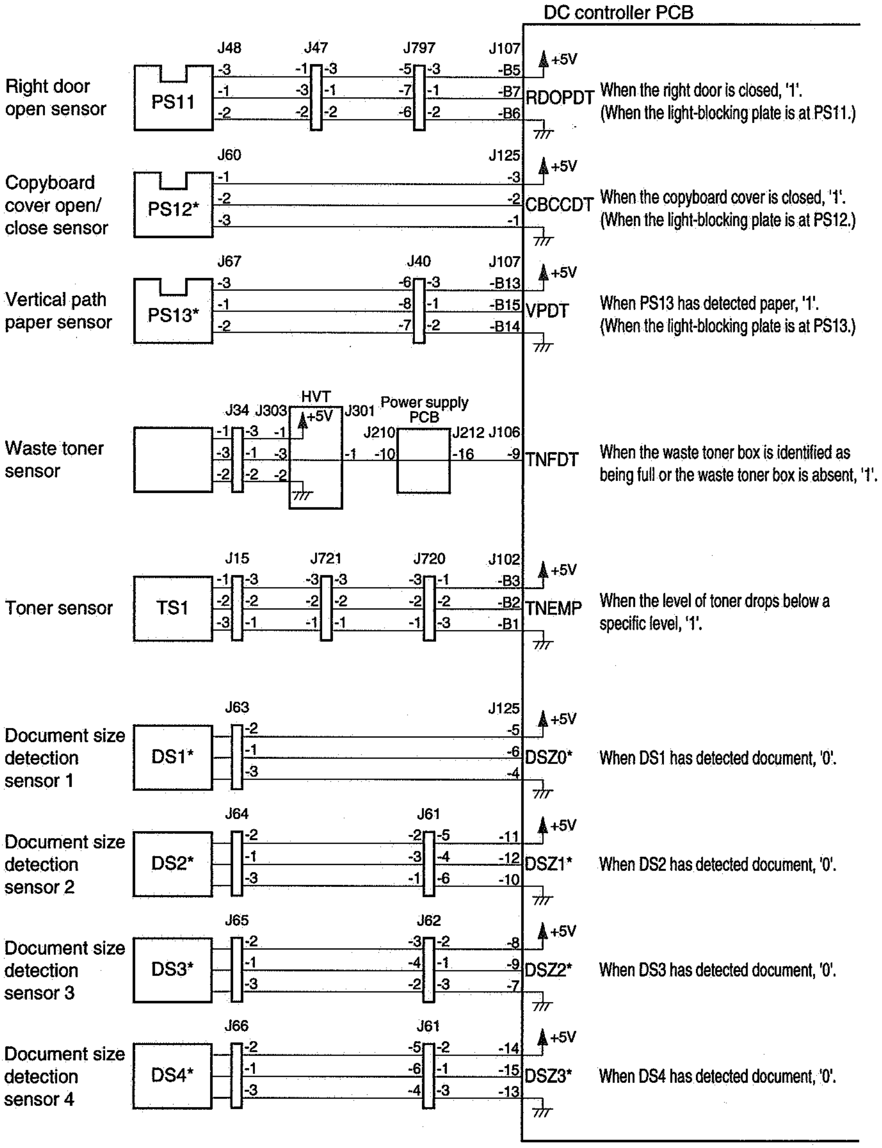
When PS7 has detected paper, '1'.
(When the light-blocking plate is at PS7.)

See p. 4-17.

See p. 5-9.

Figure 2-106

2. Inputs to the DC Controller (2/3)


DC controller PCB
Right door open sensor
PS11
J48
J47
J797
J107
-B5
-B7
-B6
+5V
RDOPDT
When the right door is closed, '1'.
(When the light-blocking plate is at PS11.)
Copyboard cover open/ close sensor
PS12*
J60
J125
CBCCDT
When the copyboard cover is closed, '1'.
(When the light-blocking plate is at PS12.)
Vertical path paper sensor
PS13*
J67
J40
J107
-B13
-B15
-B14
VPDT
When PS13 has detected paper, '1'.
(When the light-blocking plate is at PS13.)
Waste toner sensor
J34
J303
HVT
J301
Power supply PCB
J210
J212
J106
TNFDT
When the waste toner box is identified as being full or the waste toner box is absent, '1'.
Toner sensor
TS1
J15
J721
J720
J102
-B3
-B2
-B1
TNEMP
When the level of toner drops below a specific level, '1'.
Document size detection sensor 1
DS1*
J63
J125
DSZ0*
When DS1 has detected document, '0'.
Document size detection sensor 2
DS2*
J64
J61
DSZ1*
When DS2 has detected document, '0'.
Document size detection sensor 3
DS3*
J65
J62
DSZ2*
When DS3 has detected document, '0'.
Document size detection sensor 4
DS4*
J66
J61
DSZ3*
When DS4 has detected document, '0'.

*NP7210 only

Figure 2-107

3. Inputs to the DC Controller (3/3)

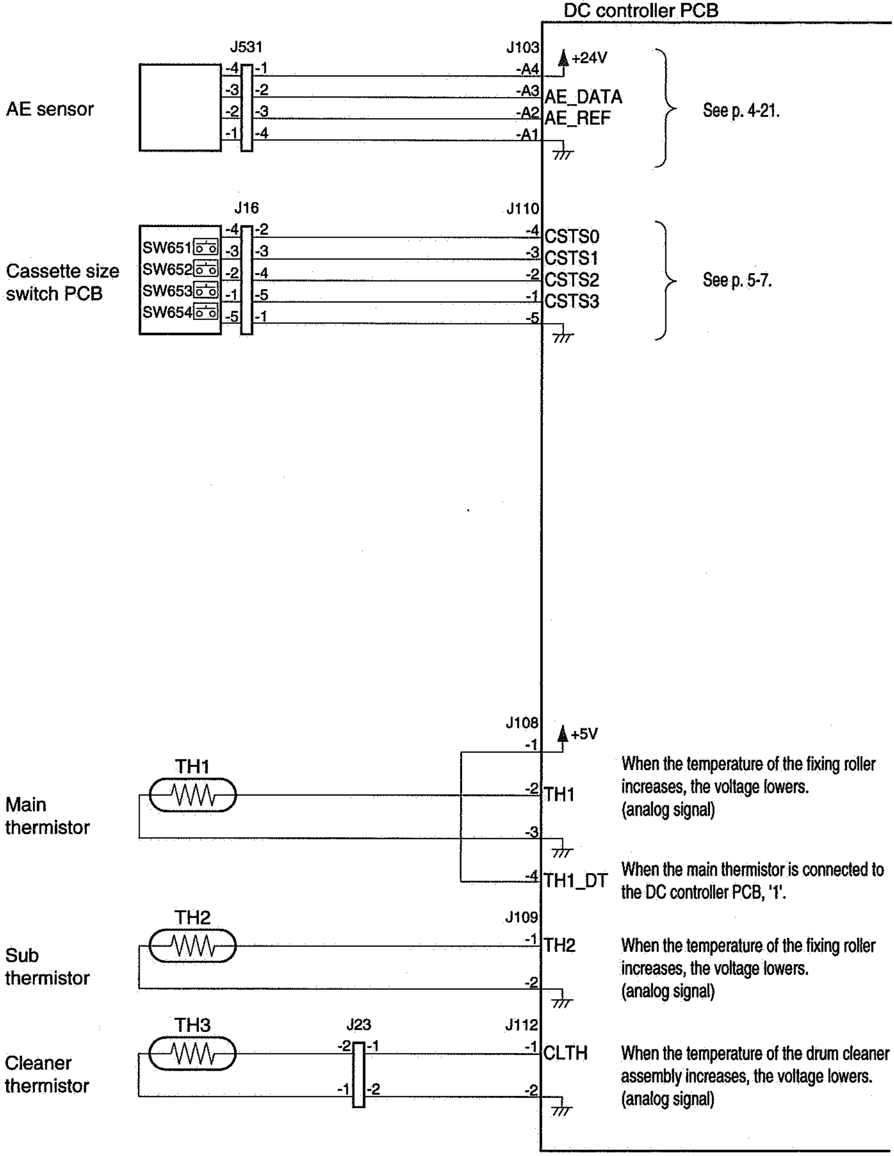

DC controller PCB
AE sensor
J531
-4 -1
-3 -2
-2 -3
-1 -4
J103
-A4
-A3
-A2
-A1
+24V
AE_DATA
AE_REF
See p. 4-21.
Cassette size switch PCB
SW651
SW652
SW653
SW654
J16
-4 -2
-3 -3
-2 -4
-1 -5
-5 -1
J110
-4
-3
-2
-1
-5
CSTS0
CSTS1
CSTS2
CSTS3
See p. 5-7.
J108
+5V
-1
TH1
Main thermistor
-2
TH1
-3
-4
TH1_DT
When the temperature of the fixing roller increases, the voltage lowers. (analog signal)
When the main thermistor is connected to the DC controller PCB, '1'.
TH2
Sub thermistor
J109
-1
TH2
-2
When the temperature of the fixing roller increases, the voltage lowers. (analog signal)
TH3
Cleaner thermistor
J23
-2 -1
-1 -2
J112
-1
CLTH
-2
When the temperature of the drum cleaner assembly increases, the voltage lowers. (analog signal)

Figure 2-108

F. Outputs from the DC Controller

1. Outputs from the DC Controller (1/4)

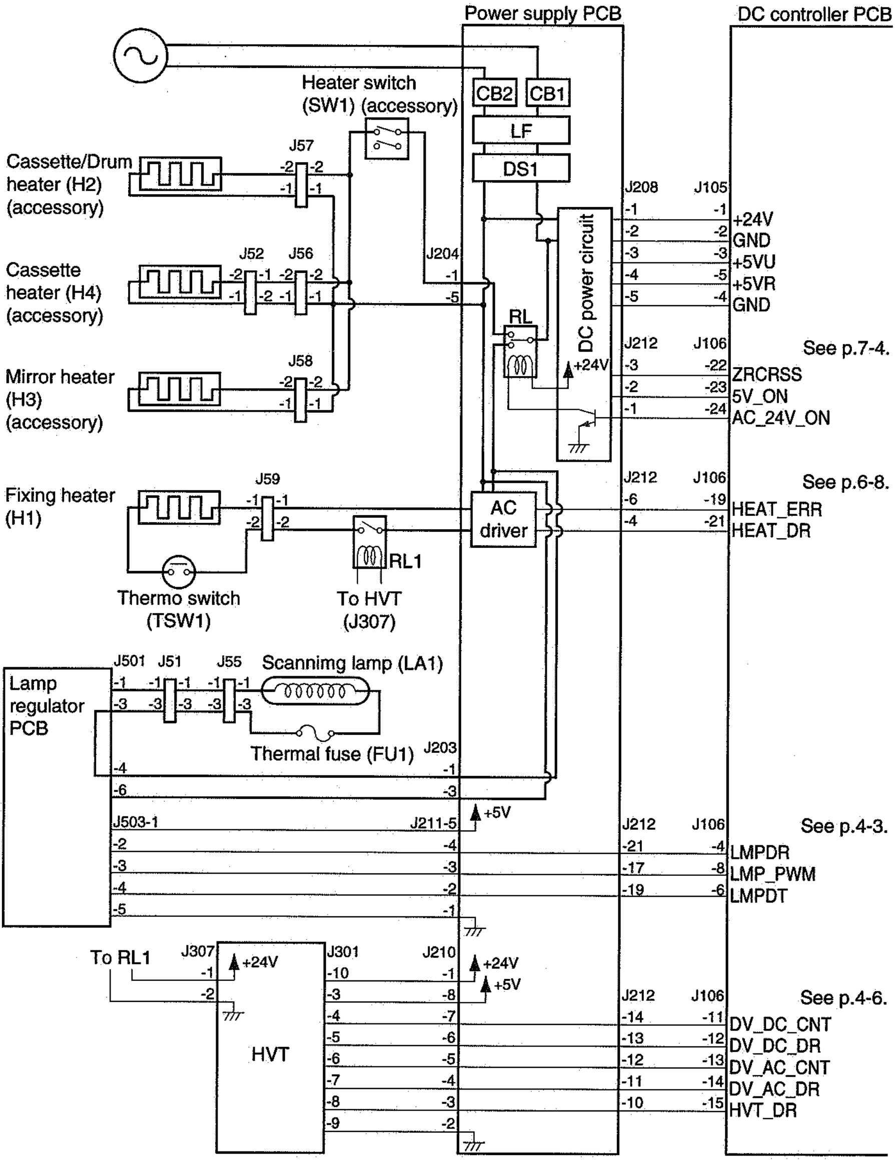
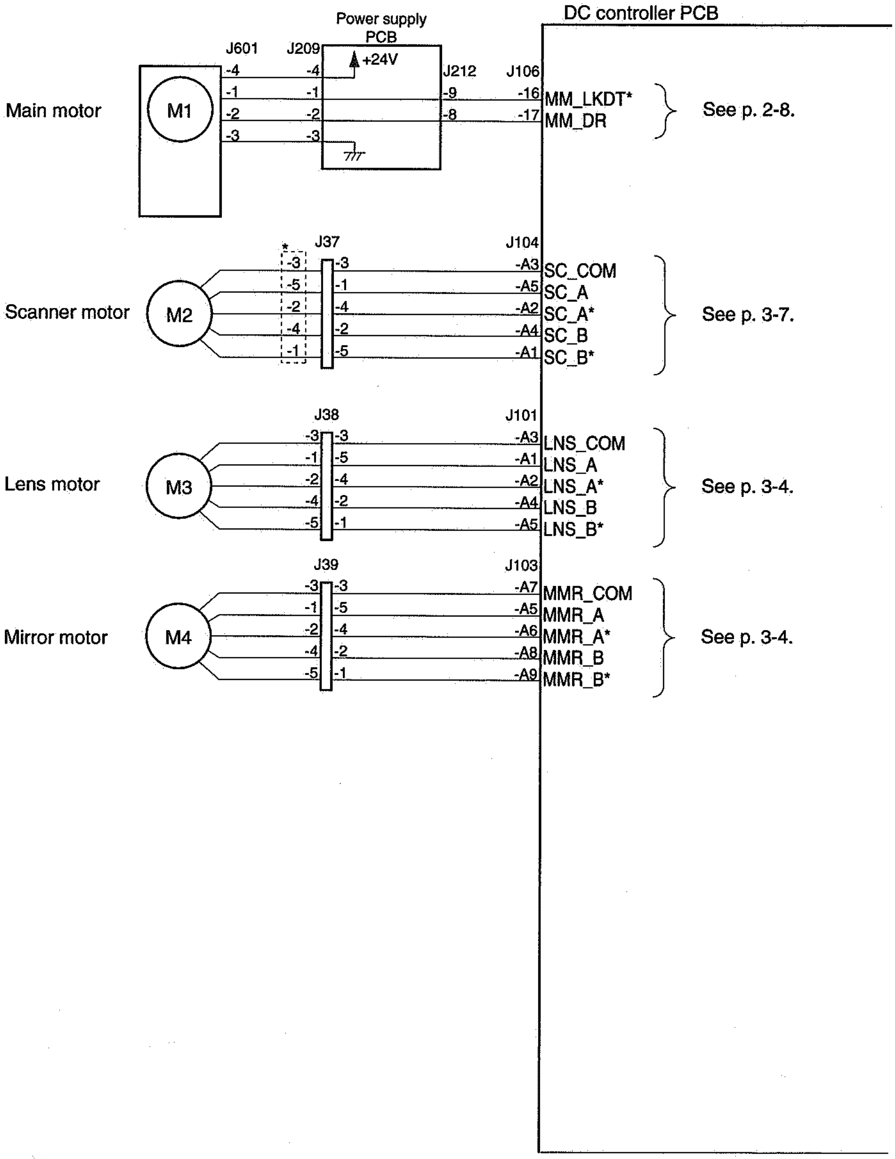

Power supply PCB
DC controller PCB
Heater switch (SW1) (accessory)
CB2
CB1
LF
DS1
Cassette/Drum heater (H2) (accessory)
J57
Cassette heater (H4) (accessory)
J52
J56
J204
Mirror heater (H3) (accessory)
J58
RL
DC power circuit
+24V
J208
J105
+24V
GND
+5VU
+5VR
GND
J212
J106
See p.7-4.
ZRCRSS
5V_ON
AC_24V_ON
Fixing heater (H1)
J59
AC driver
RL1
See p.6-8.
HEAT_ERR
HEAT_DR
Thermo switch (TSW1)
To HVT (J307)
Lamp regulator PCB
J501
J51
J55
Scannimg lamp (LA1)
Thermal fuse (FU1)
J203
J503-1
J211-5
+5V
See p.4-3.
LMPDR
LMP_PWM
LMPDT
To RL1
J307
+24V
J301
J210
+24V
+5V
HVT
See p.4-6.
DV_DC_CNT
DV_DC_DR
DV_AC_CNT
DV_AC_DR
HVT_DR

Figure 2-109

2. Outputs from the DC Controller (2/4)


Power supply PCB
DC controller PCB
J601
J209
+24V
J212
J106
Main motor
M1
-4
-1
-2
-3
-9
-8
-16
-17
MM_LKDT*
MM_DR
See p. 2-8.
J37
J104
Scanner motor
M2
-A3 SC_COM
-A5 SC_A
-A2 SC_A*
-A4 SC_B
-A1 SC_B*
See p. 3-7.
J38
J101
Lens motor
M3
-A3 LNS_COM
-A1 LNS_A
-A2 LNS_A*
-A4 LNS_B
-A5 LNS_B*
See p. 3-4.
J39
J103
Mirror motor
M4
-A7 MMR_COM
-A5 MMR_A
-A6 MMR_A*
-A8 MMR_B
-A9 MMR_B*
See p. 3-4.

*NP7210 only

Figure 2-110

3. Outputs from the DC Controller (3/4)

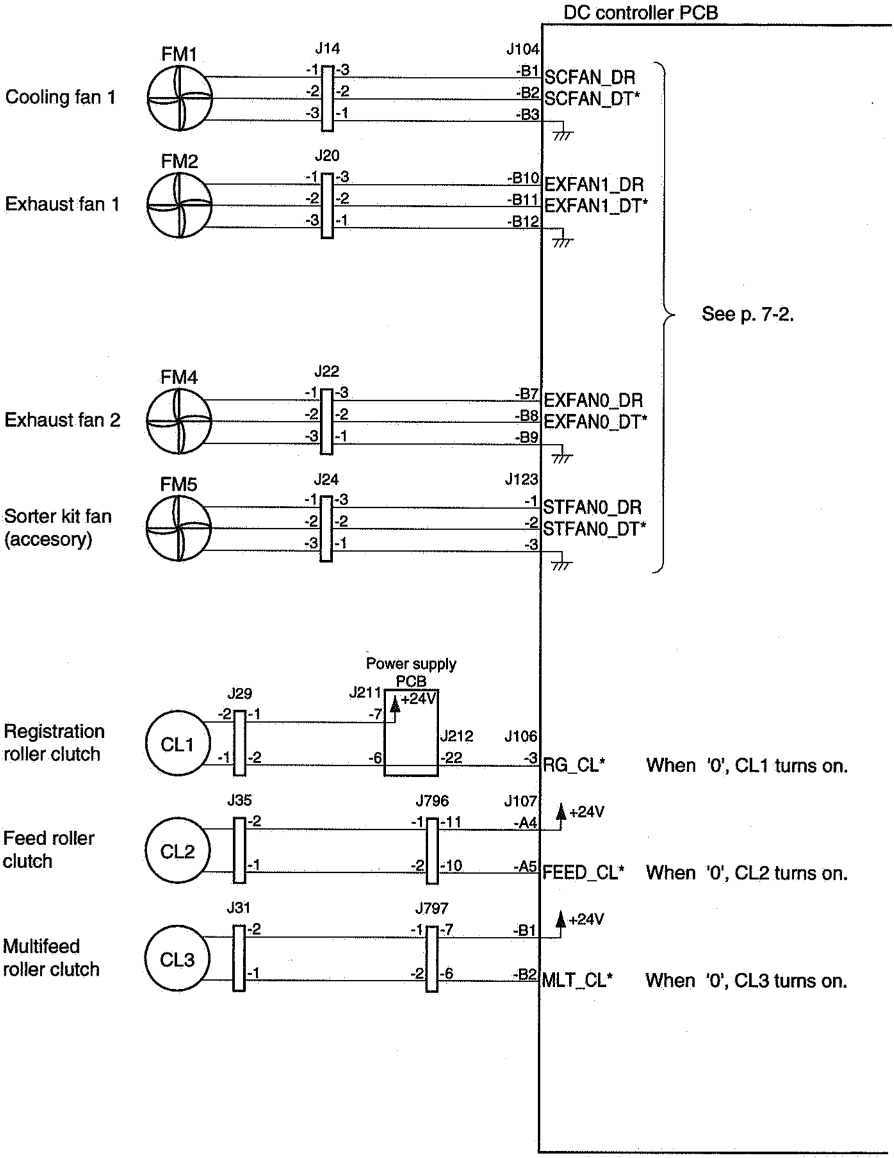

DC controller PCB
Cooling fan 1
FM1
J14
J104
-B1 SCFAN_DR
-B2 SCFAN_DT*
-B3
Exhaust fan 1
FM2
J20
-B10 EXFAN1_DR
-B11 EXFAN1_DT*
-B12
See p. 7-2.
Exhaust fan 2
FM4
J22
-B7 EXFAN0_DR
-B8 EXFAN0_DT*
-B9
Sorter kit fan (accesory)
FM5
J24
J123
-1 STFAN0_DR
-2 STFAN0_DT*
-3
Power supply PCB
J211
+24V
J212
Registration roller clutch
CL1
J29
J106
-3 RG_CL*
When '0', CL1 turns on.
Feed roller clutch
CL2
J35
J796
J107
+24V
-A4
-A5 FEED_CL*
When '0', CL2 turns on.
Multifeed roller clutch
CL3
J31
J797
+24V
-B1
-B2 MLT_CL*
When '0', CL3 turns on.

Figure 2-111

4. Outputs from the DC Controller (4/4)

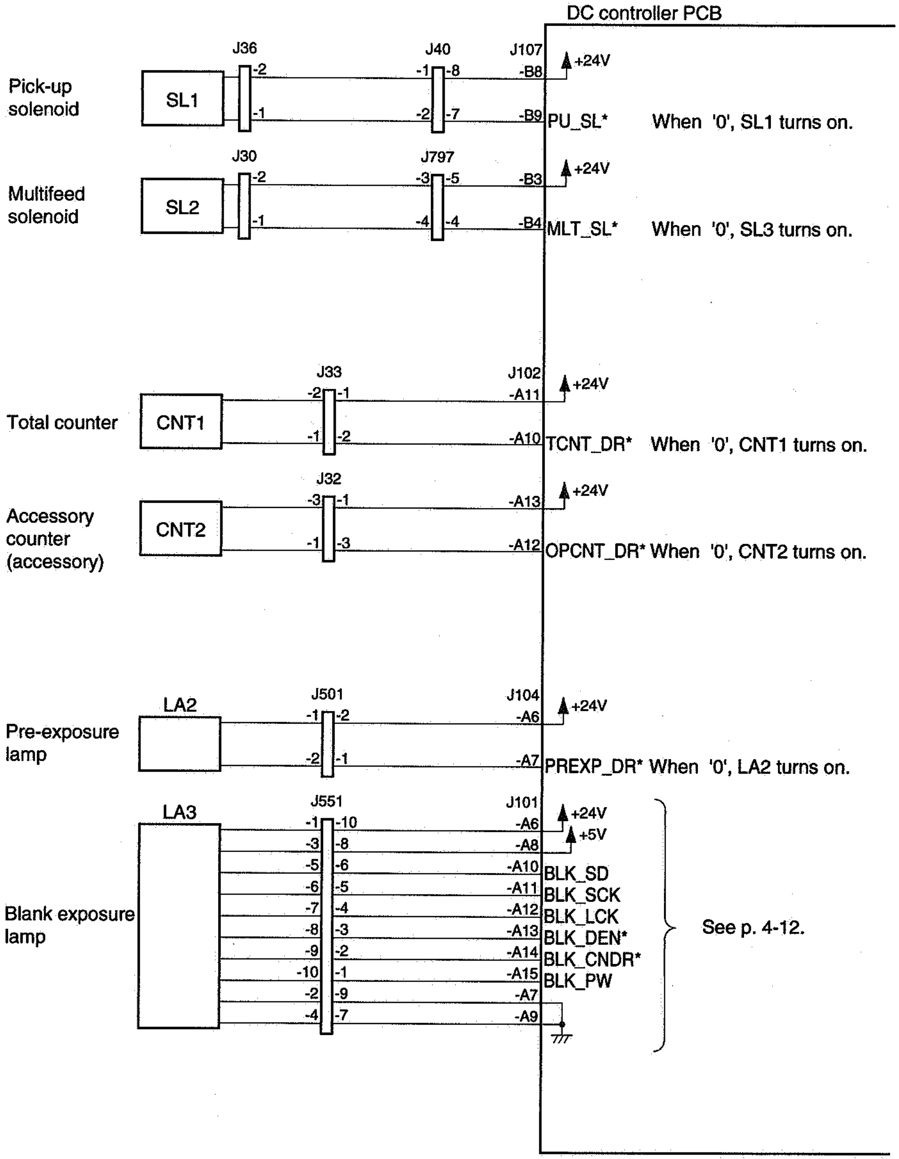
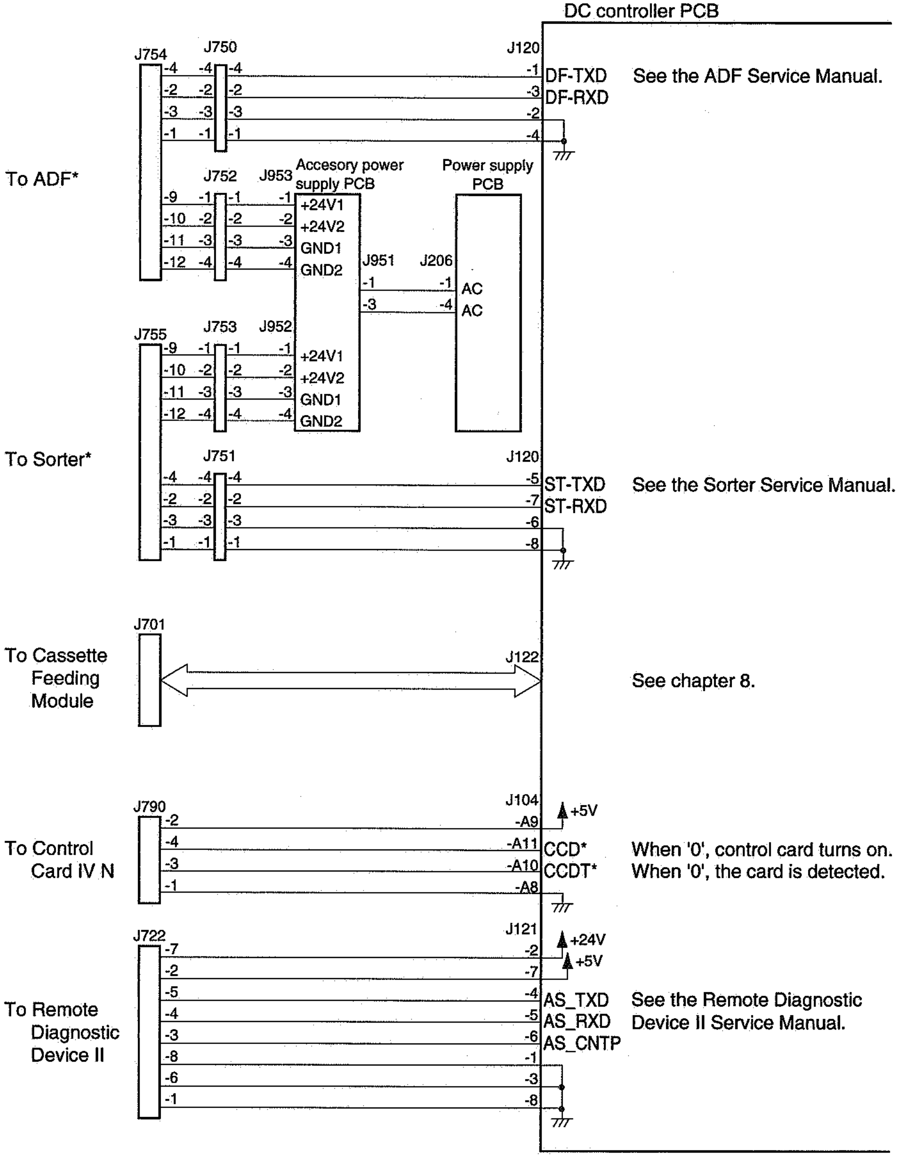

DC controller PCB
Pick-up solenoid
SL1
J36
-2
-1
J40
-1
-8
-2
-7
J107
-B8
+24V
-B9
PU_SL*
When '0', SL1 turns on.
Multifeed solenoid
SL2
J30
-2
-1
J797
-3
-5
-4
-4
-B3
+24V
-B4
MLT_SL*
When '0', SL3 turns on.
Total counter
CNT1
J33
-2
-1
-1
-2
J102
-A11
+24V
-A10
TCNT_DR*
When '0', CNT1 turns on.
Accessory counter (accessory)
CNT2
J32
-3
-1
-1
-3
-A13
+24V
-A12
OPCNT_DR*
When '0', CNT2 turns on.
LA2
Pre-exposure lamp
J501
-1
-2
-2
-1
J104
-A6
+24V
-A7
PREXP_DR*
When '0', LA2 turns on.
LA3
Blank exposure lamp
J551
-1
-10
-3
-8
-5
-6
-6
-5
-7
-4
-8
-3
-9
-2
-10
-1
-2
-9
-4
-7
J101
-A6
+24V
-A8
+5V
-A10
BLK_SD
-A11
BLK_SCK
-A12
BLK_LCK
-A13
BLK_DEN*
-A14
BLK_CNDR*
-A15
BLK_PW
-A7
-A9
See p. 4-12.

Figure 2-112

G. Inputs to and Outputs from Accessories (1/1)


DC controller PCB
J754
J750
J120
-4 -4 -4 -1 DF-TXD
-2 -2 -2 -3 DF-RXD
-3 -3 -3 -2
-1 -1 -1 -4
See the ADF Service Manual.
To ADF*
J752
J953
Accesory power supply PCB
Power supply PCB
-9 -1 -1 -1 +24V1
-10 -2 -2 -2 +24V2
-11 -3 -3 -3 GND1
-12 -4 -4 -4 GND2
J951
J206
-1 -1 AC
-3 -4 AC
J755
J753
J952
-9 -1 -1 -1 +24V1
-10 -2 -2 -2 +24V2
-11 -3 -3 -3 GND1
-12 -4 -4 -4 GND2
To Sorter*
J751
J120
-4 -4 -4 -5 ST-TXD
-2 -2 -2 -7 ST-RXD
-3 -3 -3 -6
-1 -1 -1 -8
See the Sorter Service Manual.
J701
To Cassette Feeding Module
J122
See chapter 8.
J790
J104
+5V
-2 -A9
-4 -A11 CCD*
-3 -A10 CCDT*
-1 -A8
To Control Card IV N
When '0', control card turns on.
When '0', the card is detected.
J722
J121
+24V
+5V
-7 -2
-2 -7
-5 -4 AS_TXD
-4 -5 AS_RXD
-3 -6 AS_CNTP
-8 -1
-6 -3
-1 -8
To Remote Diagnostic Device II
See the Remote Diagnostic Device II Service Manual.

*NP7161/NP7210 only

Figure 2-113

CHAPTER 3

EXPOSURE SYSTEM

This chapter discusses the principles of operation used for the copier's lens drive unit and scanner drive unit. It also explains the timing at which these drive units are operated, and shows how they may be disassembled/assembled and adjusted.

I. OUTLINE OF OPERATION 3-1
  A. Changing the Reproduction Ratio 3-1
II. LENS DRIVE SYSTEM 3-3
  A. Driving the Lens 3-3
III. SCANNER DRIVE SYSTEM 3-6
  A. Outline 3-6
  B. Scanner Motor Control Circuit 3-7
  C. Relationship between Scanner Sensor and Signals 3-7
  D. Basic Sequence of Operations (scanner) 3-8
  E. Scanner Movement in Page Separation Mode 3-9
IV. OTHERS 3-10
  A. Detecting the Original Size 3-10
V. DISASSEMBLY/ASSEMBLY 3-15
  A. Scanner Drive Assembly 3-16
  B. Lens Drive Assembly 3-22

I. OUTLINE OF OPERATION

A. Changing the Reproduction Ratio

The reproduction ratio in the axial direction of the photosensitive drum is varied by the lens drive system and the mirror drive system, and that in the peripheral direction of the photosensitive drum is changed by the scanner drive system.

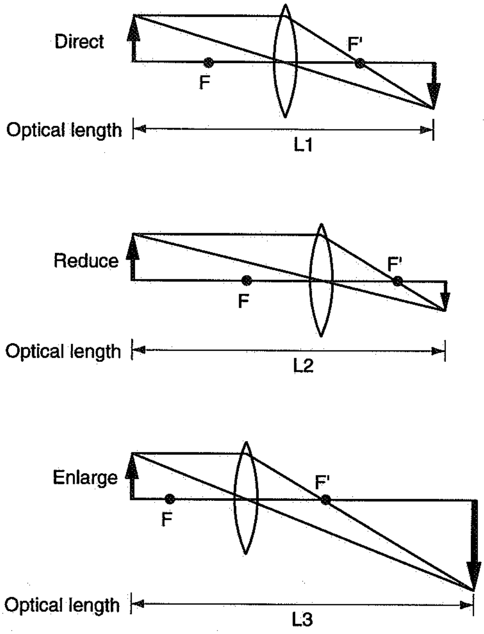
The lens drive system uses a lens array and, as shown in Figure 3-101, the lens position and the optical length are varied to change the reproduction ratio in the axial direction of the photosensitive drum.

The optical length is varied, as shown in Figure 3-102, by changing the location of the No. 4/ No. 5 mirror unit.

The scanner drive system moves the No. 1 mirror relatively faster (in Reduce) or slower (in Enlarge) than the photosensitive drum (peripheral speed) to change the reproduction ratio in the peripheral direction of the photosensitive drum.

Note:

1. In Direct, the speed of the No. 1 mirror is made identical to the peripheral speed of the photosensitive drum.
2. In both Reduce and Enlarge, the optical length is longer than in Direct.



Optical length : L1<L2, L1<L3

Figure 3-101

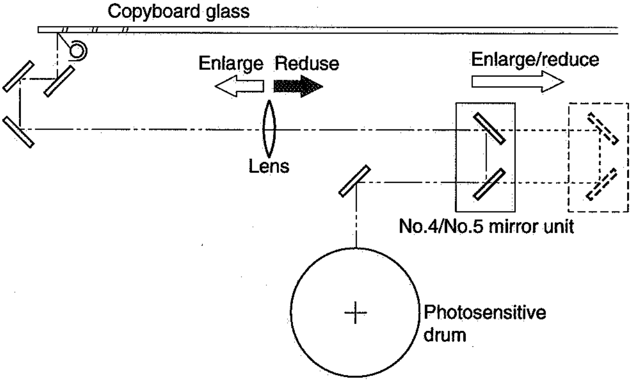

Copyboard glass
Enlarge
Reduse
Enlarge/reduce
Lens
No.4/No.5 mirror unit
Photosensitive
drum

Figure 3-102

II. LENS DRIVE SYSTEM

A. Driving the Lens

1. Outline

The lens is driven by the lens motor (M3) and the mirror motor (M4).

As shown in Figure 3-201, when the lens motor rotates in normal direction, the lens moves in the direction of Enlarge by the drive coming through gears and drive belt.

At this time, the No. 4/No. 5 mirror unit moves by the drive coming from the mirror motor in the direction of Enlarge/Reduce according to how much the lens moves (reproduction ratio), thereby varying the optical length.

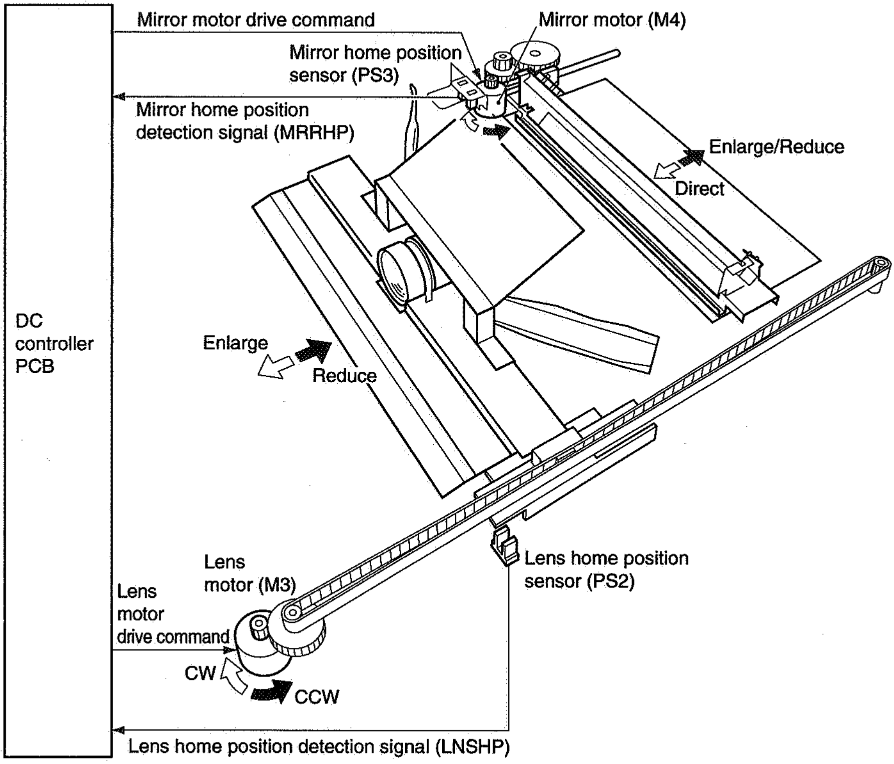

Mirror motor drive command
Mirror motor (M4)
Mirror home position sensor (PS3)
Mirror home position detection signal (MRRHP)
Enlarge/Reduce
Direct
DC controller PCB
Enlarge
Reduce
Lens motor (M3)
Lens motor drive command
CW
CCW
Lens home position sensor (PS2)
Lens home position detection signal (LNSHP)

Figure 3-201

2. Motor Control Circuit

The lens motor (M3) and the mirror motor (M4) are 4-phase stepping motors, and are controlled by the motor drive power supply signal (COM) and four drive pulse signals (A, B, A*, B*) generated by the DC controller PCB.

The direction of rotation of the motor is switched by changing the timing at which the four drive pulse signals (A, B, A*, B*) are generated.

The motor drive power supply signal (COM) is used to supply +24 V when rotating each motor. It is used to provide +5 V when the motors are at rest, thereby ensuring that the lens and the No. 4/No. 5 mirror unit remain still against vibration.

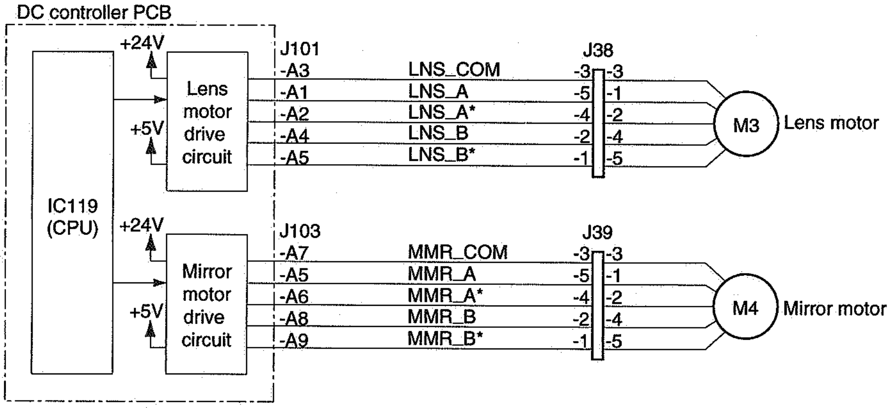

DC controller PCB
IC119 (CPU)
+24V
+5V
Lens motor drive circuit
Mirror motor drive circuit
J101
-A3
-A1
-A2
-A4
-A5
LNS_COM
LNS_A
LNS_A*
LNS_B
LNS_B*
J38
-3 -3
-5 -1
-4 -2
-2 -4
-1 -5
M3
Lens motor
J103
-A7
-A5
-A6
-A8
-A9
MMR_COM
MMR_A
MMR_A*
MMR_B
MMR_B*
J39
-3 -3
-5 -1
-4 -2
-2 -4
-1 -5
M4
Mirror motor

Figure 3-202

3. Moving the Lens

The lens and the No. 4/ No. 5 mirror unit are moved with reference to the points at which the lens home position sensor (PS2) and the mirror home position sensor (PS3) turn on.

The number of pulses (indicating the positions of the lens and the No. 4/ No. 5 mirror) applied to each motor is stored in memory by the microprocessor on the DC controller PCB. When the lens and the No. 4/ No. 5 mirror unit need to be moved, the appropriate number of pulses that suits the selected reproduction ratio is generated.

When the lens and the No. 4/ No. 5 mirror unit need to be moved in the direction of reduction (e.g., from Direct to Reduce), each motor is rotated in reverse first to move the lens and the No. 4/ No. 5 mirror unit past the position found for the selected reproduction ratio. Thereafter, the motors are rotated in normal direction so as to move the lens and the No. 4/ No. 5 mirror unit to their appropriate positions. Ending the motor rotation when they are rotating in normal direction ensures accurate positioning of the lens and the No. 4/ No. 5 mirror unit.

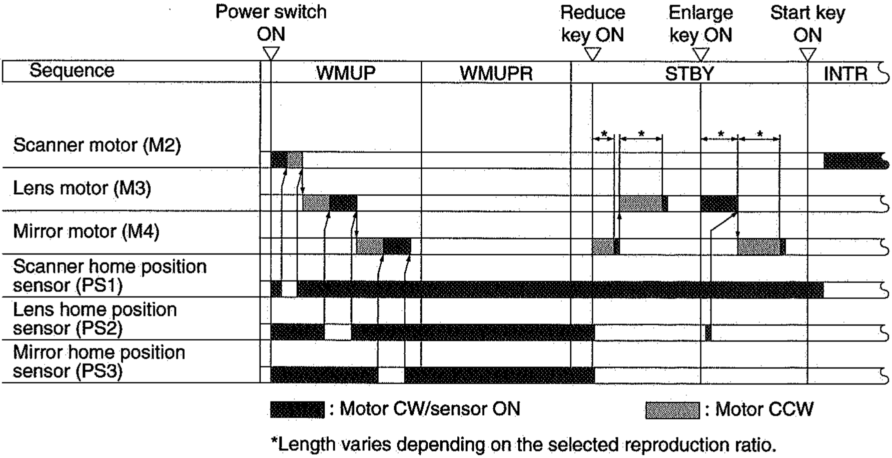


Figure 3-203

The copier enables adjustment of the lens or the No. 4/No. 5 mirror unit home position in service mode.

III. SCANNER DRIVE SYSTEM

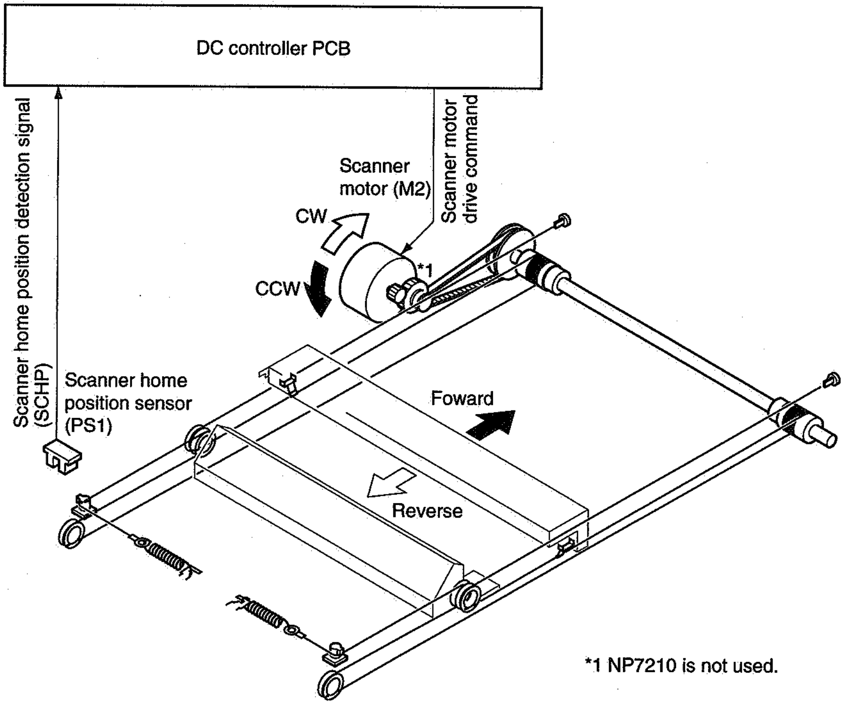
A. Outline

The scanner is driven by the scanner motor (M2)

As shown in Figure 3-301, in the case of the NP7161/NP7160 when the scanner motor rotates in reverse direction, the scanner moves forward by the drive coming through the gears, drive belt, and cable. In the case of the NP7210, when the scanner motor rotates in normal direction, the scanner motor moves foward by the drive coming through the drive belt and cable. (The scanner motor rotates in reverse of NP7161/NP7160, because the NP7210 don't equip the gear*1) The scanner motor is rotated in the opposite direction to move the scanner in reverse.

The speed of rotation of the scanner motor when the scanner is moved forward is varied according to the selected reproduction ratio. The speed when the scanner is moved in reverse, however, is the same regardless of the selected reproduction ratio—it is about 2.5 times the speed used in Direct when the scanner is moved forward (NP7210 is about 7.7 times the speed used in Direct when the scanner is moved forward).

The distance over which the scanner is moved varies according to the length of copy paper and the selected reproduction ratio.


DC controller PCB
Scanner home position detection signal (SCHP)
Scanner motor drive command
Scanner motor (M2)
CW
CCW
*1
Scanner home position sensor (PS1)
Foward
Reverse

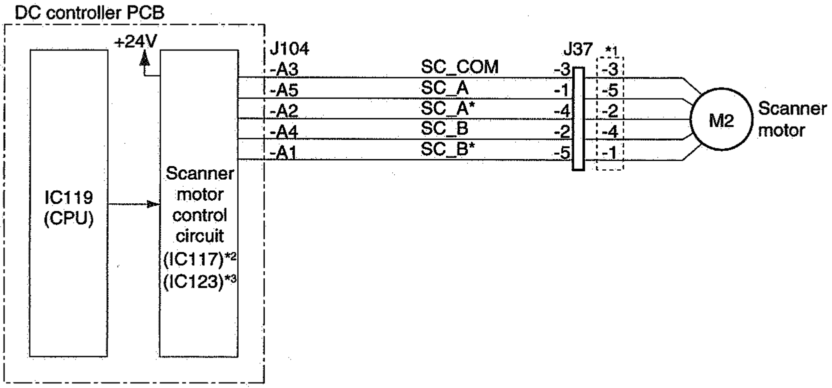
*1 NP7210 is not used.

Figure 3-301

B. Scanner Motor Control Circuit

The scanner motor (M2) is a 4-phase stepping motor, and is controlled by four pulse signals (SC_A, SC_B, SC_A*, SC_B*) generated by the DC controller PCB.

The scanner motor is turned on/off and its direction of rotation are controlled by changing the timing at which these four pulse signals are generated. The speed of rotation, on the other hand, is controlled by switching the current supplied to the scanner motor.


DC controller PCB
+24V
IC119
(CPU)
Scanner
motor
control
circuit
(IC117)*2
(IC123)*3
J104
-A3
-A5
-A2
-A4
-A1
SC_COM
SC_A
SC_A*
SC_B
SC_B*
J37
*1
-3
-1
-4
-2
-5
-3
-5
-2
-4
-1
M2
Scanner
motor

*1 NP7210 only *2 NP7161/NP7160 *3 NP7210

Figure 3-302

C. Relationship between Scanner Sensor and Signals

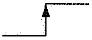
Sensor	Signal	Scanner		Description
		Foward	Reverse	
Scanner home position sensor (PS1)	SCHP			• The scanner is at home position.
				• The scanner has reached home position.

Table 3-301

D. Basic Sequence of Operations (scanner)

The scanner is moved forward over a distance determined by the microprocessor based on the selected paper size, reproduction ratio, and copying mode.

The microprocessor computes the dimensions of the original in reference to the selected paper size and reproduction ration to determine how much the scanner should be moved forward.

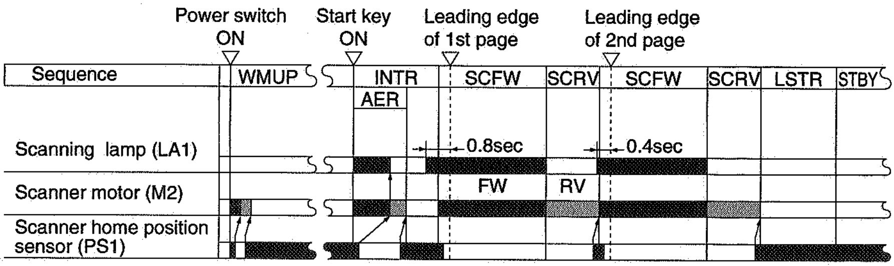

Power switch ON
Start key ON
Leading edge of 1st page
Leading edge of 2nd page
Sequence
WMUP
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
Scanning lamp (LA1)
0.8sec
0.4sec
Scanner motor (M2)
FW
RV
Scanner home position sensor (PS1)

Figure 3-303

E. Scanner Movement in Page Separation Mode

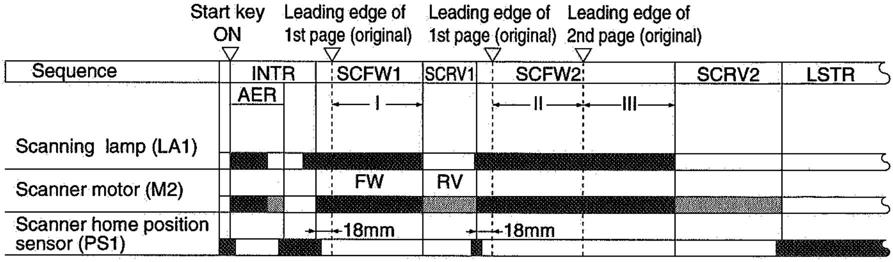

Start key ON
Leading edge of 1st page (original)
Leading edge of 1st page (original)
Leading edge of 2nd page (original)
Sequence
INTR
AER
SCFW1
SCRV1
SCFW2
SCRV2
LSTR
I
II
III
Scanning lamp (LA1)
Scanner motor (M2)
FW
RV
Scanner home position sensor (PS1)
18mm
18mm

Figure 3-304

I, II, and III shown in Figure 3-304 are controlled by the microprocessor on the DC controller PCB with reference to the wait position of the scanner.

The length from wait position to the leading edge is 18 mm. The microprocessor determines how much the scanner should be moved (including the distance to the leading edge) according to the selected reproduction ratio and the original size or cassette size.

I, II : The distance over which the scanner is moved forward for the 1st page is determined according to the selected reproduction ratio and the original size or cassette size.

III : The distance over which the scanner is moved forward is determined as follows: the microprocessor divides the detected original size by 2, and assumes the result of the division to be the middle of the original (assuming the middle to be the leading edge of the 2nd page).

If original size detection is not performed, the microprocessor uses the cassette size when determining the distance over which the scanner should be moved.

Reference:

The copier does not require paper size registration for the multifeeder. For this reason, it cancels Page Separate mode if the Start key is pressed after selecting the multifeeder. But when the original size is detected, it is possible to make copies from the multifeeder in the page separation mode.

IV. OTHERS

A. Detecting the Original Size

1. Outline

The NP7161/NP7210 is equipped with auto paper selection and auto reproduction selection functions, and these functions require identification of the size of originals.

To enable identification, the copier uses the following:

- original size detection by the ADF (NP7161/NP7210)
- Document size detection by document sensor (NP7210 only)

2. Detection of the Original Size by the ADF

The size of originals is detected when originals are fed by the ADF. (For details, see the ADF Service Manual.)

3. Document Size Detection by Document Sensor (NP7210 only)

a. Outline

As shown in Figure 3-401, the NP7210 is equipped with document size sensors (AB ; 4/ INCH ; 3) on the bottom of the copyboard which detect the size of the document when the copyboard cover is closed.

- AB

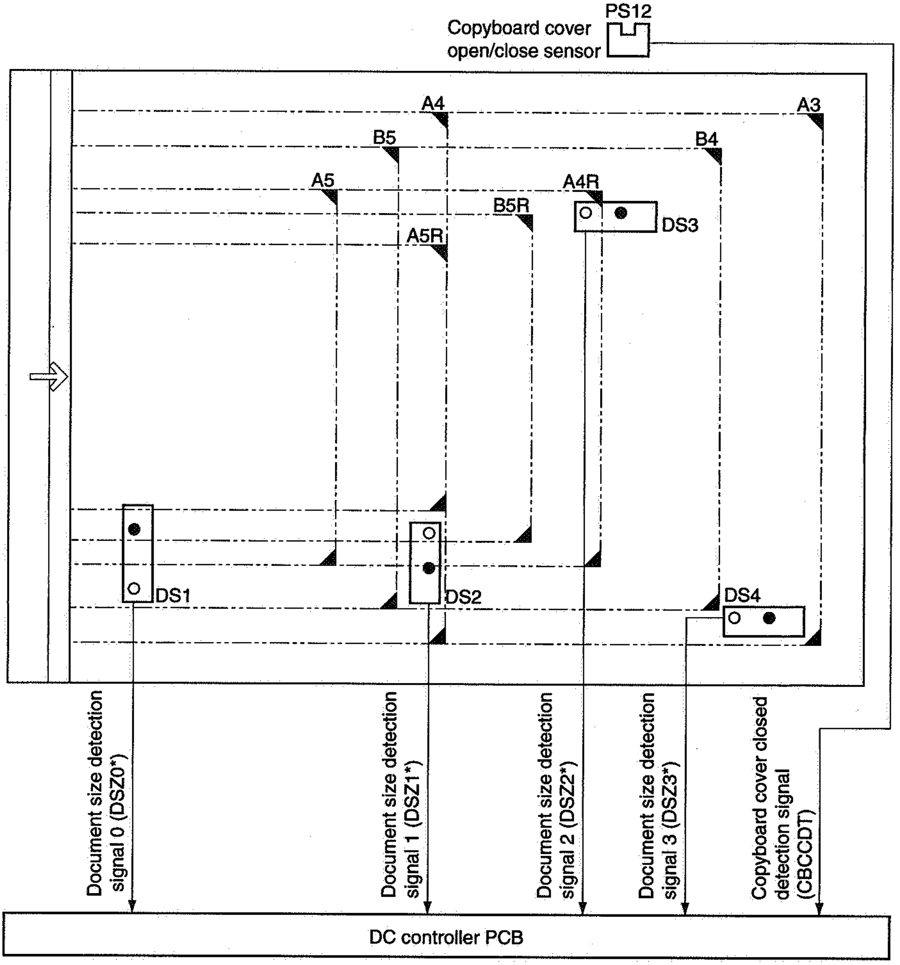

PS12
Copyboard cover open/close sensor
A4
A3
B5
B4
A5
A4R
B5R
DS3
A5R
DS1
DS2
DS4
Document size detection signal 0 (DSZ0*)
Document size detection signal 1 (DSZ1*)
Document size detection signal 2 (DSZ2*)
Document size detection signal 3 (DSZ3*)
Copyboard cover closed detection signal (CBCCDT)
DC controller PCB

Figure 3-401a

- INCH

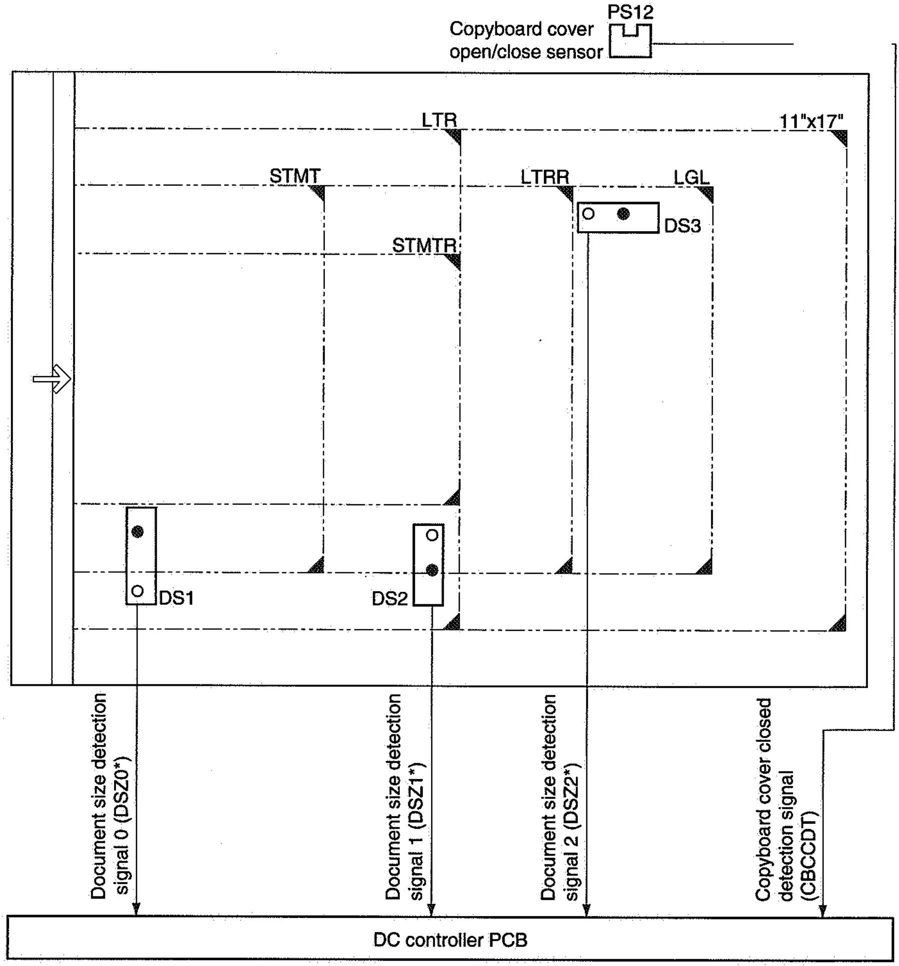

PS12
Copyboard cover open/close sensor
LTR
11"x17"
STMT
LTRR
LGL
DS3
STMTR
DS1
DS2
Document size detection signal 0 (DSZ0*)
Document size detection signal 1 (DSZ1*)
Document size detection signal 2 (DSZ2*)
Copyboard cover closed detection signal (CBCCDT)
DC controller PCB

Figure 3-401b

b. Operation

When the copyboard cover is closed to within 30°, the copyboard cover open/close sensor (PS12) located on the rear of the copier is activated.

The document size sensor detects the document repeatedly at intervals of 0.1 sec. for 15 sec. from the time the copyboard cover open/close sensor is activated, sending a signal to the DC controller PCB.

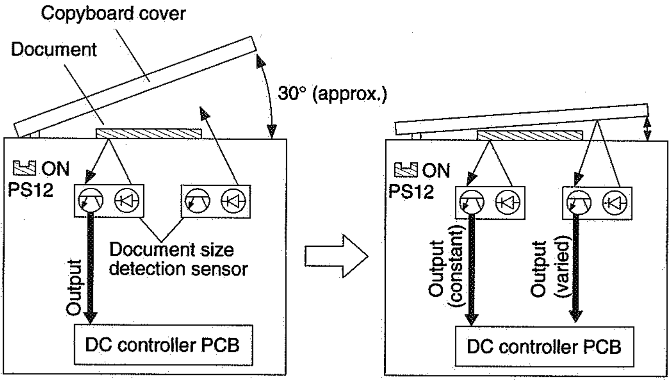


Figure 3-402

When there is a document in a position where it is detected by the document size sensor, light reflected from the document surface is transmitted to the sensor. The document size detection signal remains constant, therefore, from immediately after activation of PS12 until the copyboard cover is closed completely.

On the other hand, when there is no document in the sensing position of the document size sensor, no reflected light from the document surface can be transmitted to the sensor immediately after activation of PS12, and the sensor receives reflected light until the copyboard cover is completely closed. The document size detection signal is, therefore, varied by the process of closing the copyboard cover.

As explained above, if there is no change in the document size detection signal immediately after activation of PS12 until the copyboard cover is completely closed, a document is assumed to be present in the sensing position of the document size sensor, while on the other hand, a change in the signal indicates that there is no document present.

This method makes it possible to detect the size even of black documents.

Reference

When the copyboard cover is open (PS12 OFF), the largest size paper is selected from the cassettes in the copier.

c. Document Size

The DC controller PCB detects the document size by a combination of the document size detection signals (DSZ0*, DSZ1*, DSZ2* and DSZ3*), as shown in the tables below.

- AB

Size	Document size detection			
	DS1 (DSZ0*)	DS2 (DSZ1*)	DS3 (DSZ2*)	DS4 (DSZ3*)
A5, A5R	0	0	0	0
B5	1	0	0	0
B5R	0	1	0	0
A4	1	1	0	0
A4R	0	1	1	0
B4	1	1	1	0
A3	1	1	1	1

Table 3-401a

- INCH

Size	Document size detection		
	DS1 (DSZ0*)	DS2 (DSZ1*)	DS3 (DSZ2*)
STMT, STMTR	0	0	0
LTRR	0	1	0
LTR	1	1	0
LGL	0	1	1
11"x17" (279x432mm)	1	1	1

Table 3-401b

V. DISASSEMBLY/ASSEMBLY

The copier may be disassembled and assembled as shown here. Pay attention to the copier's mechanical characteristics along with the steps for disassembly/assembly.

Important:

1. Turn off the power and disconnect the power plug to ensure safety whenever disassembling/ assembling the copier.
2. Unless otherwise noted, assemble the parts by reversing the steps used to disassemble them.
3. Identify the screws by type (length, diameter) to avoid use in the wrong location.
4. Use a washer where needed. The mounting screws used for the grounding wire and varistor come with a washer to ensure electric continuity. Do not forget to use these washers.
5. As a rule, do not operate the copier with any of its parts removed.
6. As screws with a broader pitch than those used in the other covers are used in the rear cover and other parts of the copier, never use screws in parts other than where they originally came from.

A. Scanner Drive Assembly

1. Removing the Scanner Motor

1) Remove the rear upper cover.
2) Disconnect the connector [1] and the two mounting screws [2].

- NP7161/NP7160

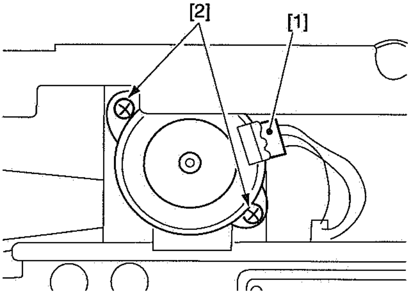


Figure 3-501a

- NP7210

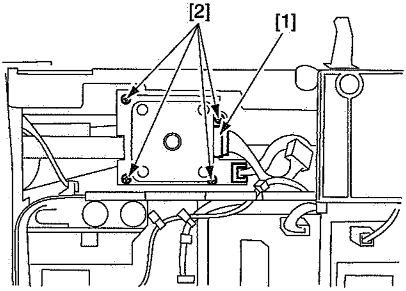


Figure 3-501b

3) Slide the scanner motor [3] to the right to detach from the motor mount; then, move it to the cut-off [A] to remove.

- NP7161/NP7160

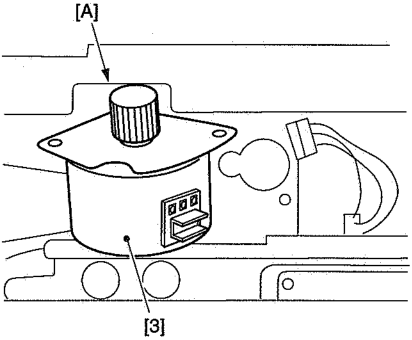


Figure 3-502a

- NP7210

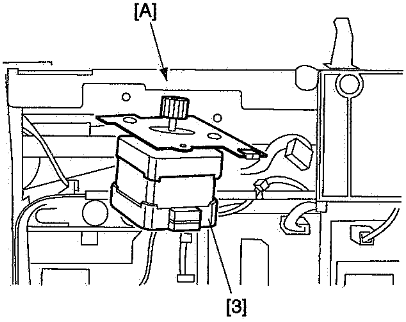


Figure 3-502b

2. Removing the Scanner Drive Cable

1) In standby state, press the Reduce key so that the lens and the No.4 /No.5 mirror unit move to 70% reproduction position.
2) Turn off the power switch, and disconnect the power plug.

Caution:
Whenever you need to perform disassembly/assembly work, be sure to turn it off and disconnect its power plug.

3) Remove the lens hood. (See p. 3-24.)
4) Remove the scanner motor. (See p. 3-16.)
5) Remove the control panel (See p. 7-13.)
6) Remove the upper left cover. (See p.7-11.)
7) Remove the upper right cover. (See p.7-10.)
8) Detach the lock support [1] from the connector base [2].
9) Remove the two mounting screws [3], and pull out the connector base [2].

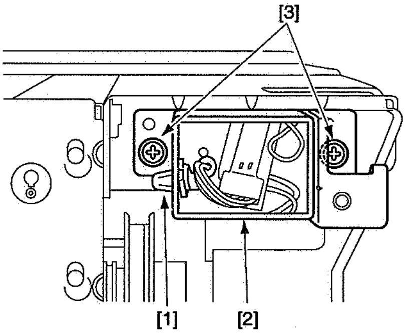


Figure 3-503

10) Remove the three mounting screws [4], and detach the motor base [5] and the timing belt [6].

Caution:
When detaching the motor base, be sure to mark its position at its four corners. When mounting it, on the other hand, be sure to refer to these markings.

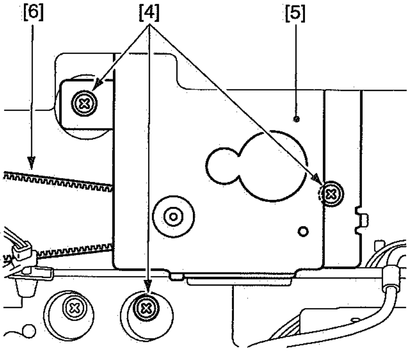


Figure 3-504

11) Holding the bent [A], pull the scanner until it reaches the hole [B]; then, remove the two screws [7].

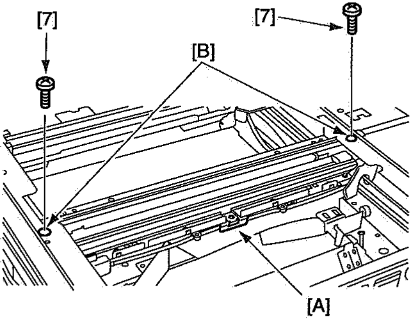


Figure 3-505

12) Remove the two tension springs [8], and detach the scanner drive cable (front) [9] and the scanner drive cable (rear) [10].

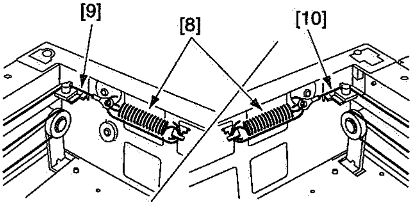


Figure 3-506

3. Routing the Scanner Drive Cable

Route the scanner drive cable following the sequence indicated in Figure 3-507, i.e., [1] through [7].

Be sure to adjust the mirror position and the tension as indicated later after routing the scanner drive cable.

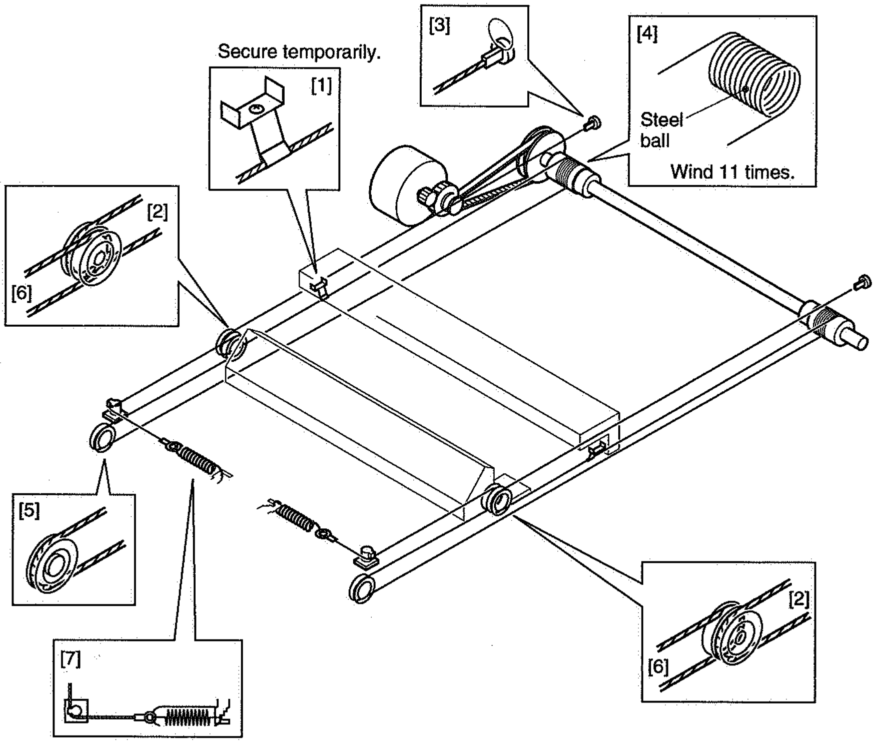

[3]
Secure temporarily.
[1]
[4]
Steel ball
Wind 11 times.
[2]
[6]
[5]
[7]
[2]
[6]

Figure 3-507

4. Adjusting the Position of the Mirror

Be sure to adjust the position of the mirror as follows after you have mounted the scanner drive cable.

1) Keep the mirror positioning tool nearby. Arrange the mirror positioning tool (FY9-3046-000) as shown to adapt it to the copier.

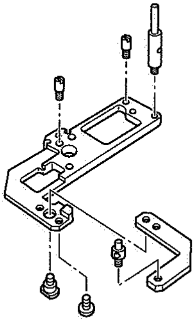


Figure 3-508a (Rear)

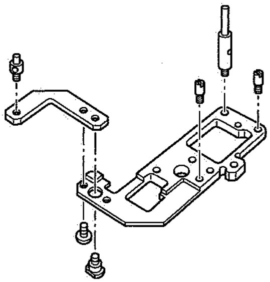


Figure 3-508b (Front)

2) Fit the mirror positioning tool [1] to the No. 1 mirror base and the No. 2 mirror base (both front and rear).
3) Tighten the mounting screw [2] on the cable metal fixing of the No. 1 mirror base (both front and rear).

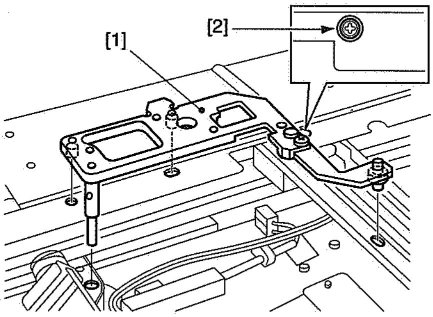


Figure 3-509a (Rear)

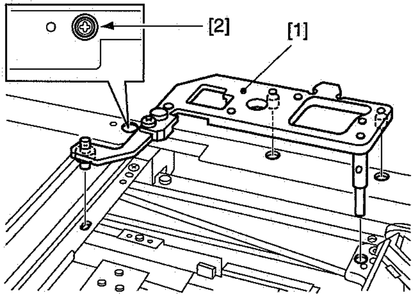


Figure 3-509b (Front)

4) Detach the mirror positioning tool.

5. Adjusting the Tension of the Scanner Drive Cable

Be sure to adjust the tension as follows after routing the scanner drive cable.

1) Move the scanner to home position.
2) Pull the center of the scanner drive cable with a spring gauge about 10 mm. At this time, adjust the position [A] of the tension spring [1] so that the reading of the spring gauge is 95 ±15 g.

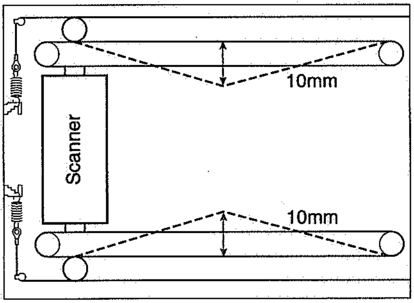


Figure 3-510

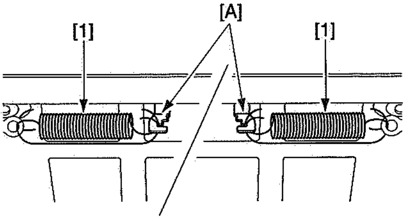


Figure 3-511

B. Lens Drive Assembly

1. Removing the Lens Drive Motor

1) Remove the copyboard glass. (See p.7-14)
2) Holding the bend [A], slide out the scanner as far as the cut-off [B].

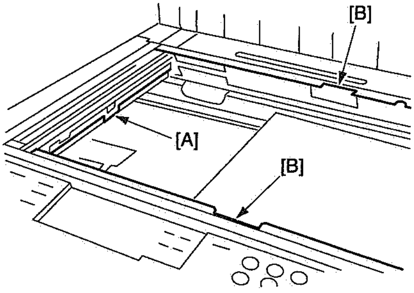


Figure 3-512

3) Remove the inside cover and the delivery upper cover. (See p.7-11)
4) Disconnect the connector [1].

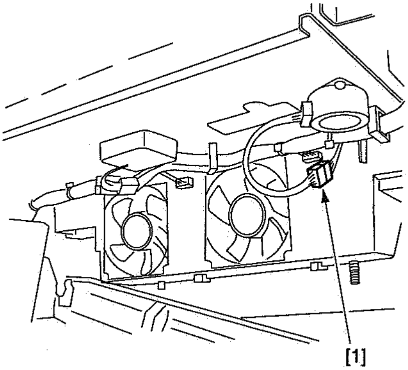


Figure 3-513

5) Remove the two screws [2], and remove the lens motor [3].

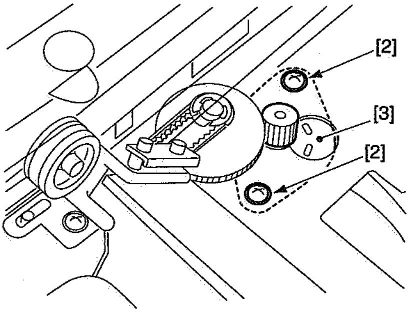


Figure 3-514

2. Removing the Mirror Motor

1) While the copier is in standby state, press the Enlarge key to move the lens and the No. 4/No. 5 mirror unit to 200% position.
2) Turn off the power switch, and disconnect the power plug.

Caution:
Whenever you are disassembling/ assembling the copier, be sure to turn off the power switch and disconnect the power plug.

3) Remove the copyboard glass. (See p.7-14)
4) Remove the developing assembly. (See p.4-37)
5) Remove the drum unit. (See p.4-28)
6) Remove the upper right cover. (See p.7-10)
7) Disconnect the connector [1].

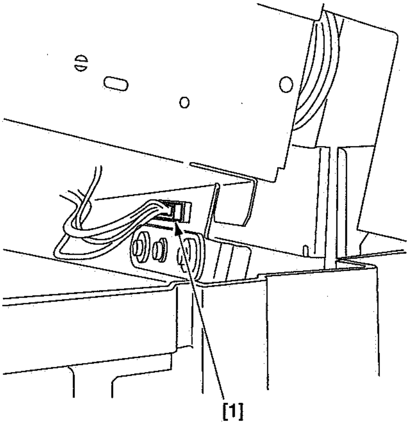


Figure 3-515

8) In the case of the NP7210, remove the screw [a] and cable cover [b], and remove the two connectors [c].

9) Remove the three mounting screws [2], and remove the lens hood [3].

- NP7161/NP7210

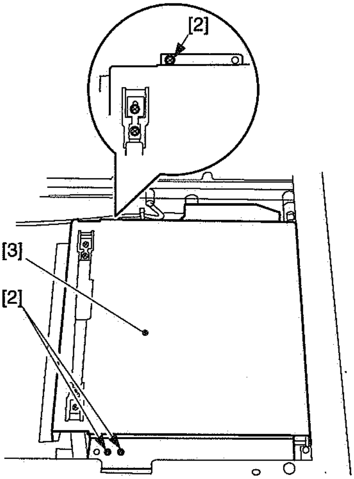


Figure 3-516a

- NP7210

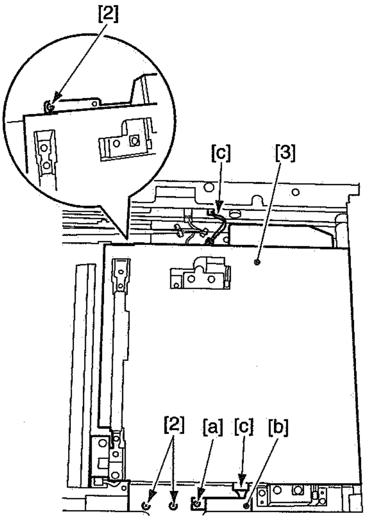


Figure 3-516b

Caution:
When mounting the lens hood, take care not to trap the wire.

10) Remove the two mounting screws [4], and remove the mirror motor [5].

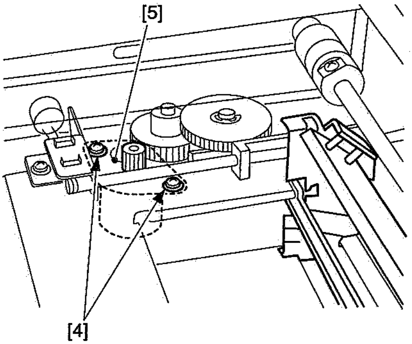


Figure 3-517

CHAPTER 4

IMAGE FORMATION SYSTEM

This chapter discusses the principles of how images are formed. It also explains the timing at which the various units involved in image formation are operated, and shows how they may be disassembled/assembled and adjusted.

I. OUTLINE OF THE PROCESSES 4-1
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  D. Controlling the Primary/Transfer Bias .. 4-6
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I. OUTLINE OF THE PROCESSES

A. Outline

Figure 4-101 shows the copier's basic construction in reference to image formation. Image formation consists of the following functions:

- Scanning lamp control
- Primary corona current control
- Transfer control current control
- Separation static eliminator bias control
- Developing bias control
- Blank exposure lamp control

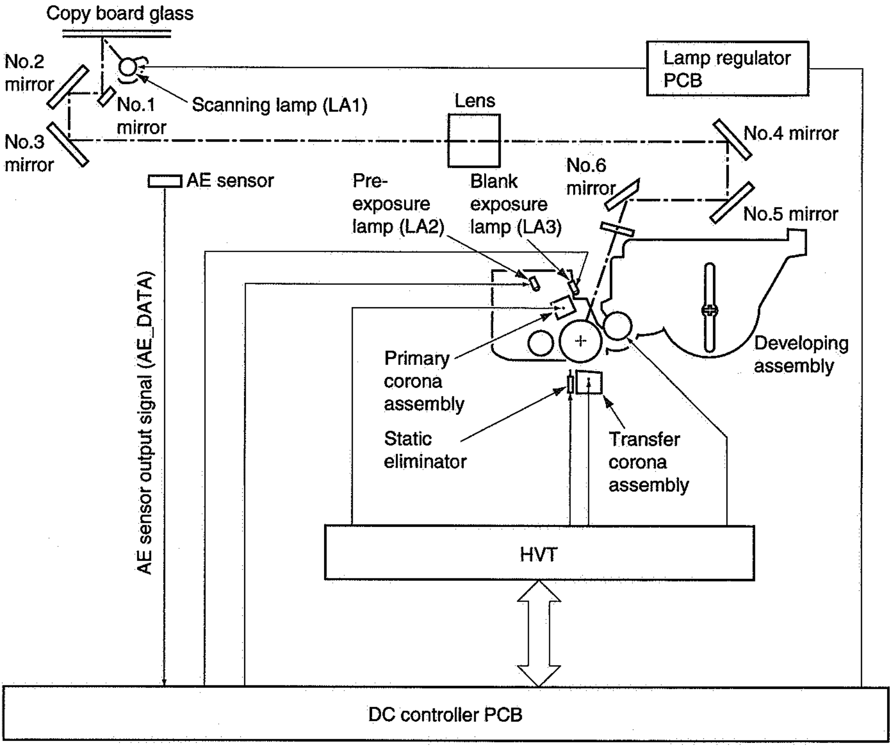

Copy board glass
No.2 mirror
No.1 mirror
Scanning lamp (LA1)
No.3 mirror
Lens
Lamp regulator PCB
No.4 mirror
No.5 mirror
No.6 mirror
AE sensor
Pre-exposure lamp (LA2)
Blank exposure lamp (LA3)
AE sensor output signal (AE_DATA)
Primary corona assembly
Developing assembly
Static eliminator
Transfer corona assembly
HVT
DC controller PCB

Figure 4-101

B. Basic Sequence of Operations (image formation system)

NP7161/NP7160 (A4, 2 Copies)

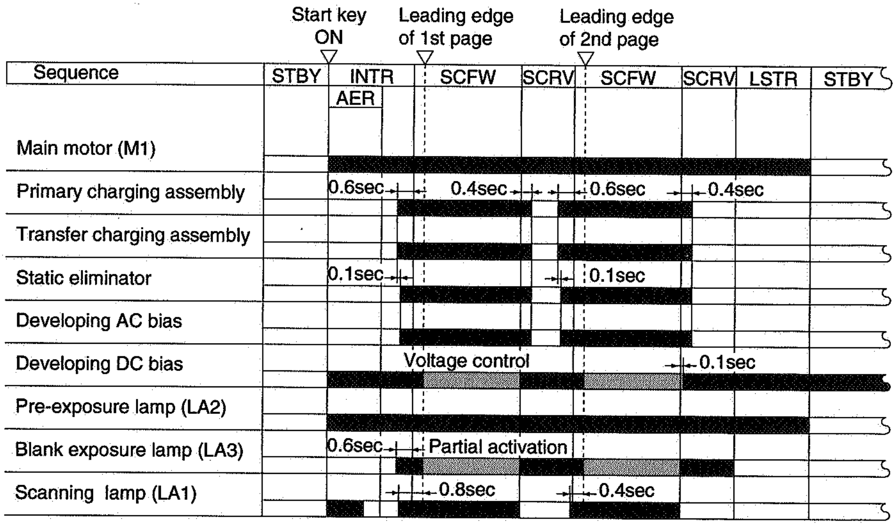

Start key ON
Leading edge of 1st page
Leading edge of 2nd page
Sequence
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
Main motor (M1)
Primary charging assembly
0.6sec
0.4sec
0.6sec
0.4sec
Transfer charging assembly
Static eliminator
0.1sec
0.1sec
Developing AC bias
Developing DC bias
Voltage control
0.1sec
Pre-exposure lamp (LA2)
Blank exposure lamp (LA3)
0.6sec
Partial activation
Scanning lamp (LA1)
0.8sec
0.4sec

Figure 4-102a

NP7210 (A4, 2 Copies)

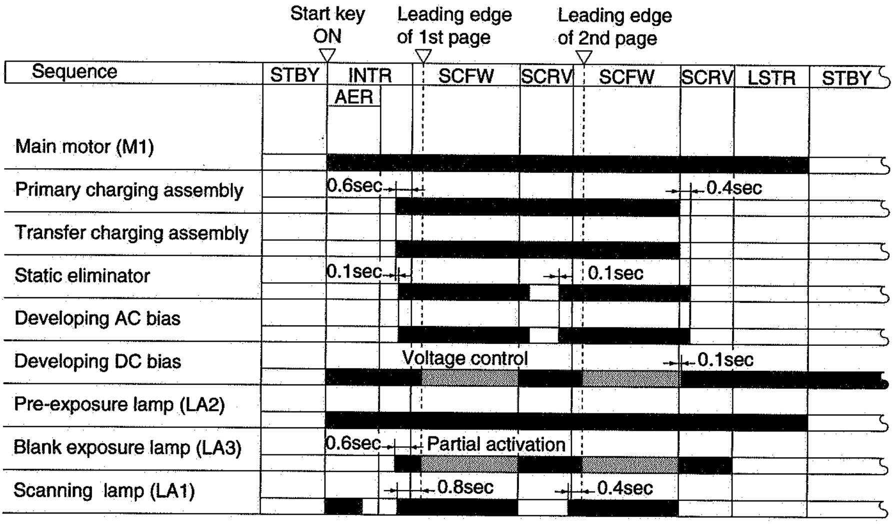

Start key ON
Leading edge of 1st page
Leading edge of 2nd page
Sequence
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
Main motor (M1)
Primary charging assembly
0.6sec
0.4sec
Transfer charging assembly
Static eliminator
0.1sec
0.1sec
Developing AC bias
Developing DC bias
Voltage control
0.1sec
Pre-exposure lamp (LA2)
Blank exposure lamp (LA3)
0.6sec
Partial activation
Scanning lamp (LA1)
0.8sec
0.4sec

Figure 4-102b

C. Controlling the Intensity of the Scanning Lamp

1. Outline

Figure 4-103 shows the circuit used to control the intensity of the scanning lamp, and the circuit has the following functions:

1. Turning on/off the scanning lamp
2. Controlling the intensity of the scanning lamp
    - controlling the light to a specific intensity against fluctuations in power supply voltage

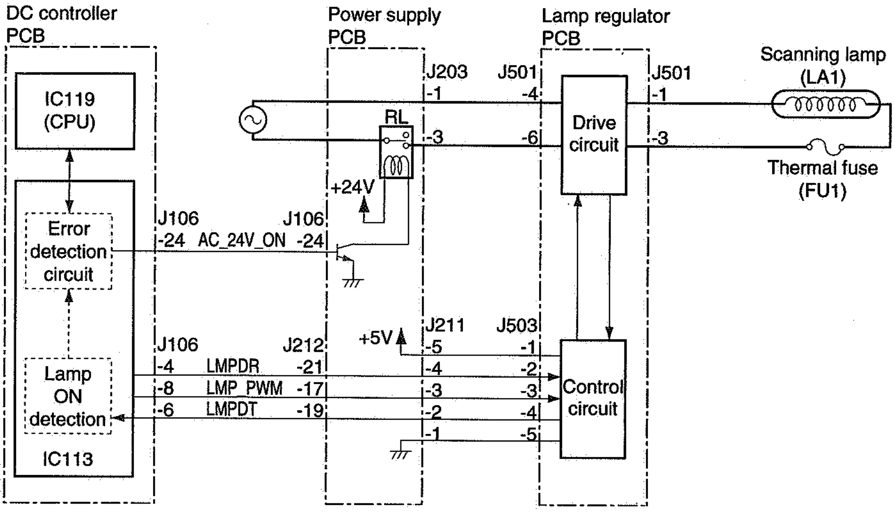

DC controller PCB
IC119 (CPU)
Error detection circuit
Lamp ON detection
IC113
Power supply PCB
RL
+24V
+5V
Lamp regulator PCB
Drive circuit
Control circuit
Scanning lamp (LA1)
Thermal fuse (FU1)
J203 -1 -3
J501 -4 -6
J501 -1 -3
J106 -24 AC_24V_ON J106 -24
J106 -4 LMPDR J212 -21
-8 LMP_PWM -17
-6 LMPDT -19
J211 -5 -4 -3 -2 -1
J503 -1 -2 -3 -4 -5

Figure 4-103

2. Operation

a. Turning On/Off the Scanning Lamp

When the scanning lamp drive signal (LMPDR) is '0', the output of the control circuit goes '0', keeping the drive circuit from turning on and therefore not supplying the scanning lamp (LA1) with AC power.

When LMPDR is '1', the output of the control circuit will be '1', turning on the drive circuit and thereby supplying the scanning lamp (LA1) with AC power.

b. Controlling the Intensity of the Scanning Lamp

As the length of the optical path changes with each magnification, it is necessary to correct the intensity of the light projected onto the photosensitive drum. The intensity of the scanning lamp, therefore, changes with each magnification.

The intensity of the scanning lamp is increased/decreased by controlling the voltage of the power supplied to the scanning lamp according to the level of the pulse width modulation signal (LMP_PWM) from the DC controller PCB.

LMP_PWM varies the pulse duty between 10% and 90% to suit the selected reproduction ratio so as to control the voltage of the power supplied to the scanning lamp as shown in Table 4-101 (actual value).

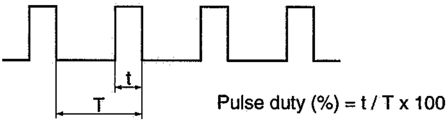


Figure 4-104

Power supply	Pulse duty	DC output
120V	10 to 90%	45 to 80V
230V	10 to 90%	98 to 175V

Table 4-101

c. Detecting the Activation of the Scanning Lamp

The control circuit on the lamp regulator PCB generates the drive detection signal (LMPDT) at all times while the scanning lamp remains on, and sends the signal to the lamp activation detection IC (IC113) on the DC controller PCB.

If the scanning lamp remains on for 21 sec or more, the error detection circuit will cause the AC_24V_ON signal to go '0', thereby cutting the supply of AC power to the lamp regulator PCB.

If an error is identified in the scanning lamp, the DC controller PCB will cut the AC power to the lamp regulator and, at the same time, will indicate 'E220' on the control panel.

3. Protection Mechanisms

To prevent malfunction of the scanning lamp (LA1), the copier is equipped with a fuse (FU1).

If the temperature around the scanning lamp increases abnormally (about 141°C or more) because of a short circuit or the like, the thermal fuse (FU1) will melt to cut the power to the scanning lamp.

D. Controlling the Primary/Transfer Bias

1. Outline

Figure 4-108 shows the circuit used to control the primary/transfer bias, and the circuit has the following functions:

1. Turning on/off the primary/transfer bias
2. Controlling the grid bias to a specific voltage
3. Controlling the primary shield current to a specific current

To eliminate the effects of changes in the environment to corona charging, the output to the primary charging assembly is controlled by controlling the shield current to a specific current.

The primary/transfer bias is turned on/off using the following signal from the DC controller PCB.

- HVT_DR (HVT drive command)

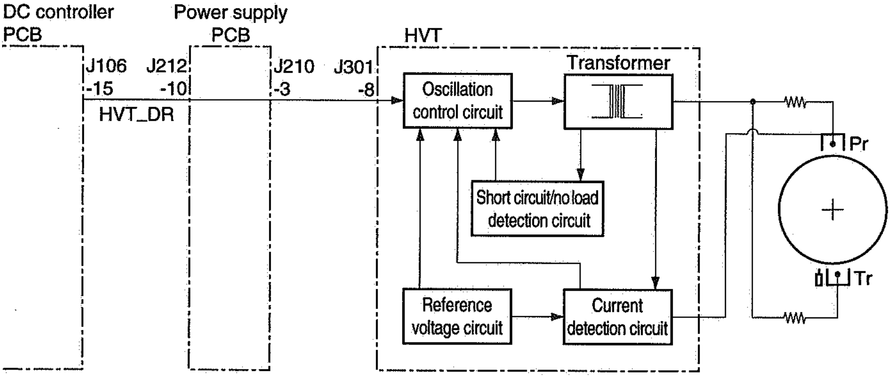

DC controller PCB
Power supply PCB
HVT
J106 -15
J212 -10
J210 -3
J301 -8
HVT_DR
Oscillation control circuit
Transformer
Short circuit/no load detection circuit
Reference voltage circuit
Current detection circuit
Pr
Tr

Figure 4-108

2. Turning On/Off the Primary/Transfer Bias

a. When the primary/transfer bias is off,

- When HVT_DR is 0,
  Oscillation control circuit turns off
  Primary/transfer high-voltage transformer turns off

b. When the primary/transfer bias is on,

- When HVT_DR is 1,
  Oscillation control circuit turns on
  Primary/transfer high-voltage transformer turns on

E. Controlling the Developing/Separation Static Eliminator Bias

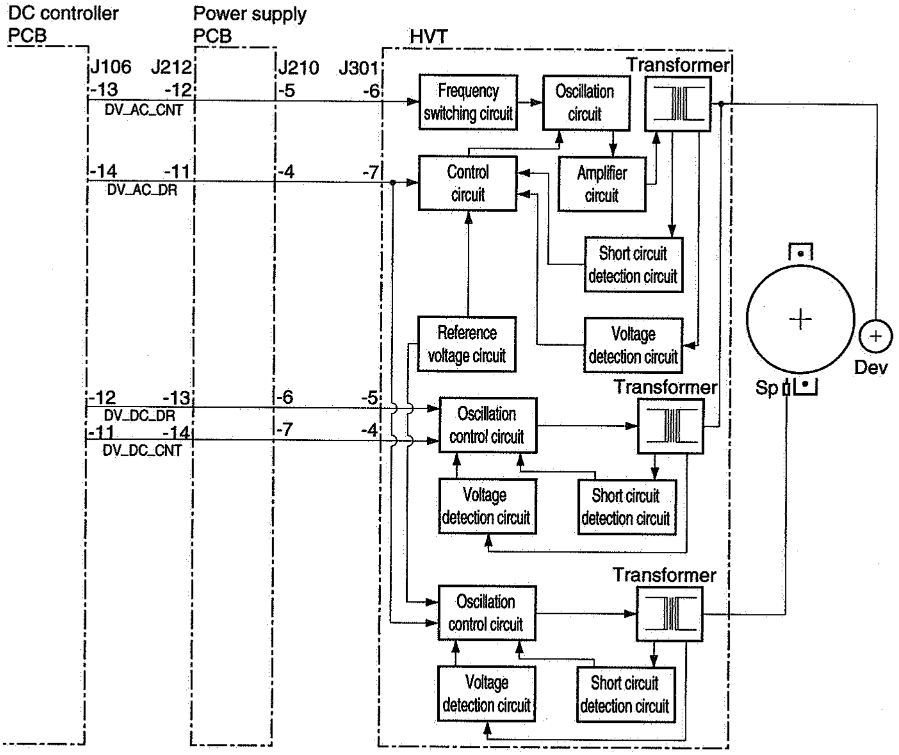
1. Outline

Figure 4-109 shows the circuit used to control the developing/static eliminating bias, and the circuit has the following functions:

1. Turning on/off the developing DC bias
2. Turning on/off the developing AC bias/separation static eliminator bias
3. Controlling the developing DC bias to a specific voltage to suit copy density

The above control mechanisms are driven by the following signals:

- DV_AC_DR (developing AC bias drive signal)
- DV_AC_CNT (developing AC bias control signal)
- DV_DC_DR (developing DC bias drive signal)
- DV_DC_CNT (developing DC bias control signal)



DC controller PCB
Power supply PCB
HVT
J106
J212
J210
J301
-13
-12
-5
-6
DV_AC_CNT
-14
-11
-4
-7
DV_AC_DR
-12
-13
-6
-5
DV_DC_DR
-11
-14
-7
-4
DV_DC_CNT
Transformer
Frequency switching circuit
Oscillation circuit
Control circuit
Amplifier circuit
Short circuit detection circuit
Reference voltage circuit
Voltage detection circuit
Transformer
Oscillation control circuit
Voltage detection circuit
Short circuit detection circuit
Transformer
Oscillation control circuit
Voltage detection circuit
Short circuit detection circuit
Dev
Sp

Figure 4-109

2. Turning On/Off the Developing DC Bias

a. Turning On/Off the Developing DC Bias

- When DV_DC_DR is 0,
  Oscillation control circuit turns off
  DC high-voltage transformer turns off

The above condition deprives the developing cylinder of developing DC bias.

- When DV_DC_DR is 1,
  Oscillation control circuit turns on
  DC high-voltage transformer turns on

The above condition supplies the developing cylinder with developing DC bias.

b. Control Timing

As shown in Figure 4-110, a specific developing DC bias (-300 V) is applied to the developing cylinder to prevent adhesion of excess toner to the photosensitive drum when copies are not being made.

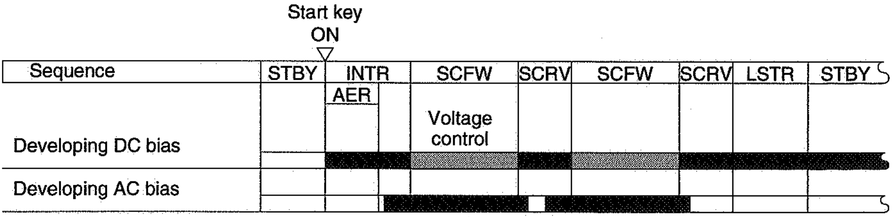

Start key
ON
Sequence
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
Voltage
control
Developing DC bias
Developing AC bias

Figure 4-110

3. Turning On/Off the Developing AC Bias/Separation Eliminator Bias

a. Turning On/Off the Developing AC Bias

- When DV_AC_DR is 0,
  control circuit turns off
  oscillation circuit turns off
  amplification circuit turns off
  AC high-voltage transformer turns off

The above condition deprives the developing cylinder of developing AC bias.

- When DV_AC_DR is 1,
  control circuit turns on
  oscillation circuit turns on
  amplification circuit turns off
  AC high-voltage transformer turns on

The above condition supplies the developing cylinder with AC bias.

b. Turning On/Off the Separation Static Eliminator

- When DV_AC_DR is 0,
  oscillation control circuit turns off
  high-voltage transformer turns off

The above condition deprives the static eliminator of separation static eliminator bias.

- When DV_AC_DR is 1,
  oscillation control circuit turns on
  high-voltage transformer turns on

The above condition supplies the static eliminator with separation static eliminator bias.

4. Controlling the Developing DC Bias to a Specific Voltage to Suit Copy Density

While copies are being made, developing AC bias and developing DC bias are applied to the developing cylinder. The developing AC bias is 1400 Vp-p, and the developing DC bias may be varied by sliding the Copy Density lever on the control panel.

When the Copy Density lever on the control panel is slid, the CPY_DNS signal will vary between 1 and 5 V. The developing DC bias will then vary between -110 and -550 V.

Normally, the optimum image is obtained when the developing DC bias is set at -270 V (CPY_DNS is 2.45V).

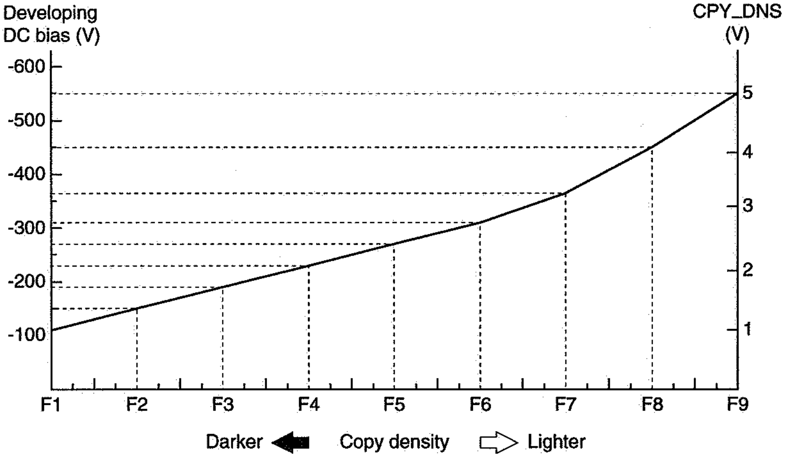


Figure 4-111

Copy density	Developing DC bias [V]	CPY_DNS [V]
F1	-110	1.00
F1.25	-120	1.09
F1.5	-130	1.18
F1.75	-140	1.27
F2	-150	1.36
F2.25	-160	1.45
F2.5	-170	1.54
F2.75	-180	1.63
F3	-190	1.72
F3.25	-200	1.81
F3.5	-210	1.91
F3.75	-220	2.00
F4	-230	2.09
F4.25	-240	2.18
F4.5	-250	2.27
F4.75	-260	2.36
F5	-270	2.45
F5.25	-280	2.54
F5.5	-290	2.63
F5.75	-300	2.72
F6	-310	2.81
F6.25	-315	2.90
F6.5	-330	3.00
F6.75	-347.5	3.16
F7	-365	3.32
F7.25	-382.5	3.48
F7.5	-400	3.64
F7.75	-425	3.86
F8	-450	4.09
F8.25	-475	4.32
F8.5	-500	4.55
F8.75	-525	4.77
F9	-550	5.00

Table 4-102

F. Controlling the Blank Exposure Lamp

1. Outline

The blank exposure lamp is an LED array (40 built-in LEDs), and its activation is controlled by a static method.

All LEDs of the blank exposure lamp are turned on while the photosensitive drum is rotating and, in addition, the scanner is not exposing an original so as to prevent adhesion of excess toner to the photosensitive drum. (The farthest LED (each at front and rear) is kept on at all times as long as the photosensitive drum is rotating.)

The charges on the photosensitive drum are removed in appropriate widths according to reproduction ratios and paper sizes while the scanner is exposing an original, thereby preventing adhesion of unwanted toner.

The copier turns on/off the ten LEDs at the center using the blank exposure lamp center activation signal (BLK_CNDR*), and controls the 15 LEDs (each at front and rear) by means of serial data communication using the following signals:

- blank exposure lamp serial data signal (BLK_SD)
- blank exposure lamp serial data clock signal (BLK_SCK)
- blank exposure lamp serial data latch signal (BLK_LCK)
- blank exposure lamp drive enable signal (BLK_DEN*)
- blank exposure lamp power supply line (BLK_PW)

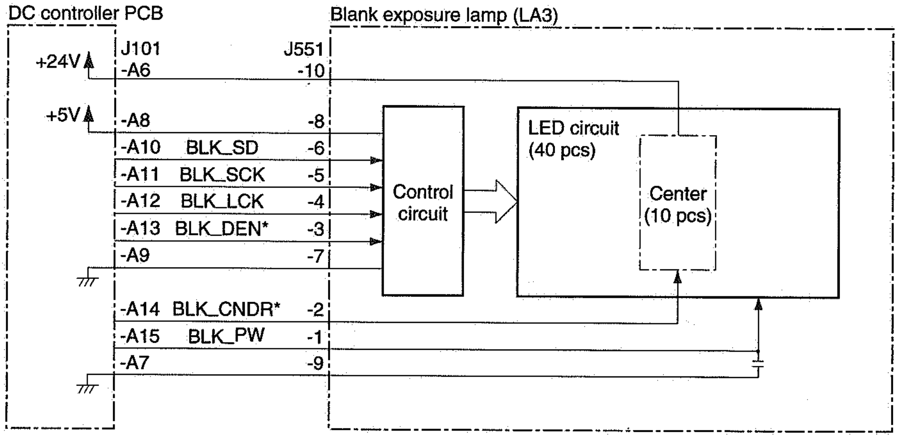

DC controller PCB
Blank exposure lamp (LA3)
+24V
+5V
J101
J551
-A6
-10
-A8
-8
-A10 BLK_SD
-6
-A11 BLK_SCK
-5
-A12 BLK_LCK
-4
-A13 BLK_DEN*
-3
-A9
-7
-A14 BLK_CNDR*
-2
-A15 BLK_PW
-1
-A7
-9
Control circuit
LED circuit (40 pcs)
Center (10 pcs)

Figure 4-112

2. Turning On the Blank Exposure Lamp in Reduce Mode

While the original is being illuminated in Reduce mode, as many LEDs (both front and rear) as suited to the selected reduction ratio are turned on to blank out the non-image widths on the photosensitive drum regardless of the selected paper size.

3. Turning On the Blank Exposure Lamp in Direct/Enlarge Mode

While the original is being illuminated in Direct/Enlarge mode, as many LEDs (both front and rear) as suited to the selected paper size (Table 4-103) are turned on to blank out the non-image widths on the photosensitive drum.

Paper size	LEDs (number of)	
	Front	Rear
A3, A4	1	1
279 × 432mm (11"×17"), LTR	3	3
B4, B5	5	5
A4R, A5, LGL, LTRR	9	9
B5R	13	13
A5R	15	15

Table 4-103

4. Turning On the Blank Exposure Lamp in Multifeeder Mode

When copies are made on paper picked up from the multifeeder, the blank exposure lamp is turned on to suit the paper width obtained by combinations of the states of the multifeeder paper width sensors 1 and 2 (PS9, 10); see p. 5-10.

II. DEVELOPING ASSEMBLY/DRUM CLEANER ASSEMBLY

A. Outline

The developing assembly and the drum cleaner are rotated by the drive from the main motor (M1) through drive gears.

The level of toner inside the developing assembly is monitored by the toner sensor (TS1); when the amount drops below a specific level, the copier turns on or flashes the Toner indicator on the control panel.

The drum cleaner assembly collects waste toner using the cleaning blade, and moves it to the waste toner case using the waste toner feeding screw. The waste toner feeding screw locked detection sensor (PS8) serves to monitor the rotation of the waste toner feeding screw.

The level of the waste toner inside the waste toner case is monitored by the waste toner sensor; when the amount of the waste toner exceeds a specific level, the copier flashes the Waste Toner indicator on the control panel.

The cleaner thermistor (TH3) serves to detect overheating of the drum cleaner assembly.

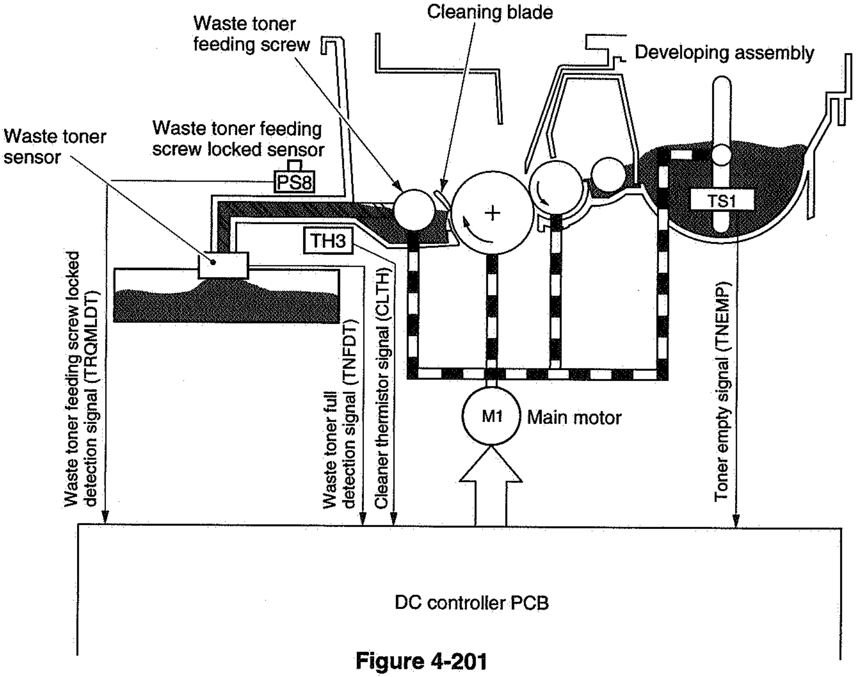

Waste toner feeding screw
Cleaning blade
Developing assembly
Waste toner sensor
Waste toner feeding screw locked sensor
PS8
TH3
TS1
Waste toner feeding screw locked detection signal (TRQMLDT)
Waste toner full detection signal (TNFDT)
Cleaner thermistor signal (CLTH)
M1
Main motor
Toner empty signal (TNEMP)
DC controller PCB

Figure 4-201

The copier is designed to collect more waste toner than existing models, and is equipped with a paddle at the bottom of the waste toner box.

The paddle is linked to the movement of the cassette, and is designed to tap on the bottom of the waste toner box to even out the toner inside it.

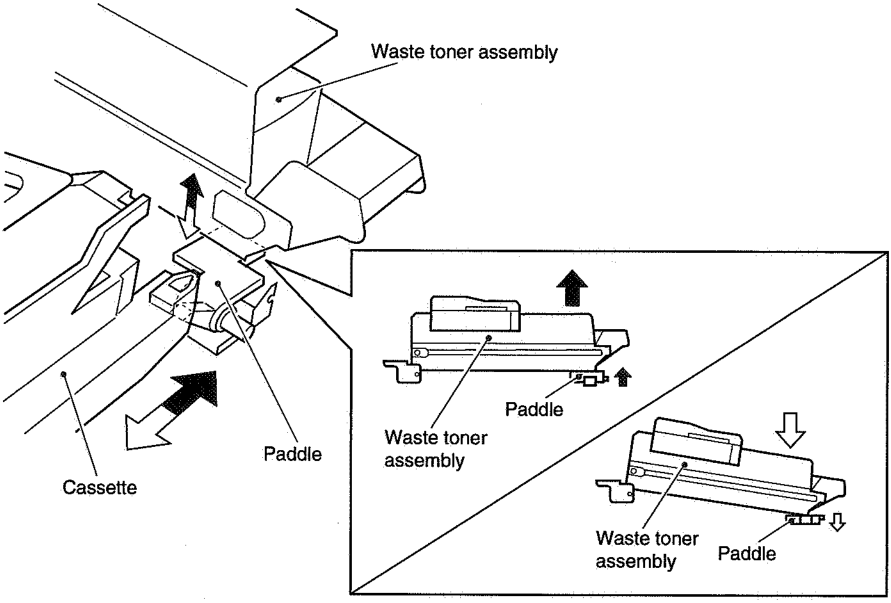

Waste toner assembly
Paddle
Cassette
Paddle
Waste toner assembly
Waste toner assembly
Paddle

Figure 4-202

As the paddle on the copier is removed when the cassette feeding module is attached, lumps in the waste toner are broken up by the waste toner receptacle swing cam fitted to the cassette feeding module. (See P.8-7)

B. Detecting and Controlling the Level of Toner

The toner inside the developing assembly is monitored by the toner sensor (TS1).

The toner sensor uses a piezoelectric oscillator which oscillates in the absence of toner over the sensor at several kHz and sends an oscillation signal (TNEMP) to the DC controller PCB. In the presence of toner over the sensor, on the other hand, the weight will prevent oscillation.

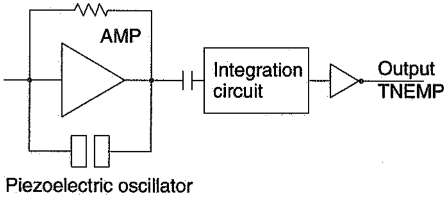


Figure 4-203

The copier detects the absence of toner in two stages.

The DC controller PCB monitors the output of the toner sensor at all times as long as the main motor is rotating. If the sum of periods of the toner absent signal is 70 sec (consecutive two periods), it will identify the condition as a condition preceding the absence of toner and will flash the Toner indicator on the control panel.

Thereafter, if the period of the toner absent signal reaches 180 sec or more, the DC controller PCB will assume the condition to be the absence of toner, and will stop flashing the Toner indicator to keep it on. At this time, the copy being made is processed as would a normal copy and discharged, and then the operation will be stopped.

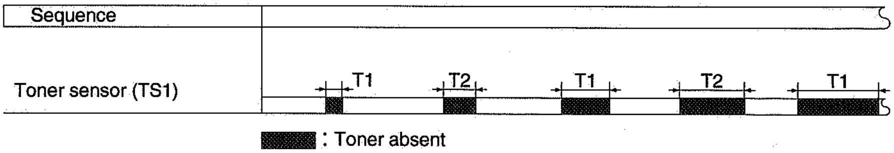


Figure 4-204

Toner indication	Conditions	Copying
Flashing	(T1+T2) or (T2+T1) ≧ 70sec	Possible
On	T1 or T2 ≧ 180sec	No possible

Table 4-201

Note:
When the DC controller identifies a condition preceding the absence of toner, there is likely to be as much as 10 g of toner inside the developing assembly. In terms of A4 copies, about 200 copies may be made without the addition of toner.

C. Monitoring the Waste Toner Feeding Screw

If the waste toner inside the drum cartridge cakes and, as a result, hinders the rotation of the waste toner feeding screw, waste toner can start to leak from the pipe. To prevent such a problem, the copier is equipped with a waste toner feeding screw detection mechanism constructed as shown in Figure 4-205.

The waste toner feeding screw is linked with a spring clutch and a flag, and is rotated by the engagement of the spring clutch with the gear A.

The rotation of the flag is monitored by the waste toner feeding screw sensor (PS8) at all times while the main motor (M1) is rotating.

When the waste toner feeding screw locks, the spring clutch is subjected to force in the axial direction and moves in the direction of the arrow, causing the flag to stop rotating. If the waste toner feeding screw lock signal (TRQMLDT) remains unchanged for 0.5 sec or more, the DC controller PCB will assume that the waste toner feeding screw became locked, and will immediately indicate ‘E013’ on the control panel and stop responding to a press on the Start key.

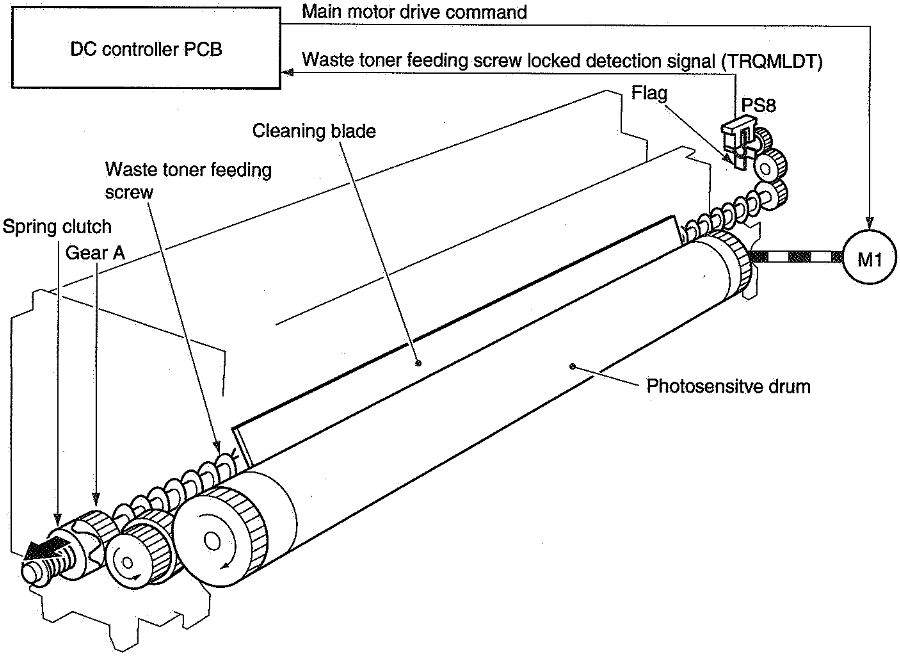

DC controller PCB
Main motor drive command
Waste toner feeding screw locked detection signal (TRQMLDT)
Flag
PS8
Cleaning blade
Waste toner feeding screw
Spring clutch
Gear A
M1
Photosensitve drum

Figure 4-205

D. Monitoring the Waste Toner Box

The copier monitors the waste toner box in two levels.

The amount of waste toner inside the waste toner box is checked by the waste toner sensor. The waste toner sensor is a pair of photosensors (light-emitting cell and light-receiving cell), and is designed to generate the waste toner full detection signal (TNFDT) when waste toner blocks the light between the two photosensors.

The DC controller PCB monitors the state of the waste toner sensor at all times; when the voltage of the waste toner full detection signal (TNFDT) drops below the reference voltage, it will identify the condition as "pre-waste toner full condition" and will flash the Waste Toner indicator on the control panel.

When the waste toner box is not set, the light-blocking plate blocks the light between the photosensors, causing the copier to flash the Waste Toner indicator.

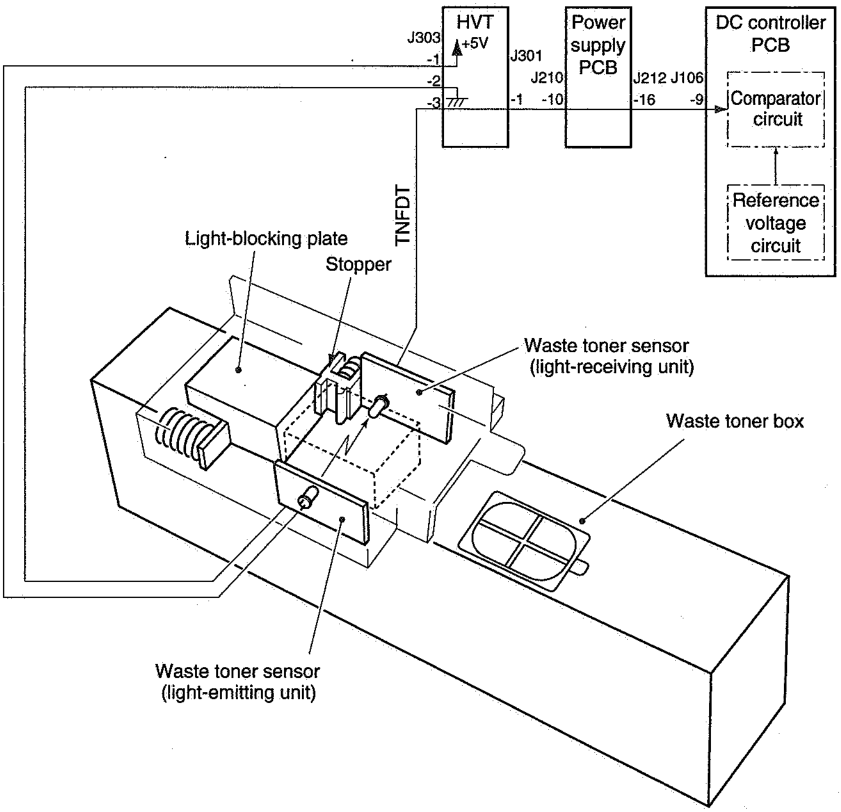

HVT
J303
+5V
-1
-2
-3
J301
J210
-1
-10
Power supply PCB
J212
J106
-16
-9
DC controller PCB
Comparator circuit
Reference voltage circuit
TNFDT
Light-blocking plate
Stopper
Waste toner sensor (light-receiving unit)
Waste toner box
Waste toner sensor (light-emitting unit)

Figure 4-206

When as many as 100 copies (A4) have been made during a pre-waste toner full condition, the DC controller PCB will identify the condition as "waste toner full," stopping to flash the Waste Toner indicator and instead keeping it on. The copier will not accept the Start key while the Waste Toner indicator remains on.

Reference:

If the DC controller PCB identifies a waste toner full condition during continuous copying, the copier will discharge copies being processed and turn on the Waste Toner indicator.

E. Control by the Cleaner Thermistor

The copier is equipped with a thermistor (cleaner thermistor TH3) used to detect overheating of the drum cleaner assembly, and is designed to perform the following according to the temperature detected by the thermistor.

- controlling the rotation of the exhaust fan (See p. 7-2.)
- controlling the copying speed down sequence

The cleaner thermistor checks for overheating of the drum cleaner at all times, and will indicate error code 'E821' on the control panel when it identifies a temperature of 55°C or more.

1. Copying Speed Down Sequence

The copying speed for A4, direct and non-AE copying is 16cpm (NP7161/NP7160) or 21cpm (NP7210).

To prevent overheating of the drum cleaner assembly in continuous copying mode or overheating of the copyboard glass in enlargement mode, the copier adjusts the sheet-to-sheet distance according to the selected copy count and the reading of the cleaner thermistor (TH3).

- A4 Original, A4 Copy (NP7161/NP7160)

Reading by cleaner thermistor (TH3)	Copy count at lower than 500			Copy count at 500 or more		
	50 to 100%	101 to 141%	142 to 200%	50 to 100%	101 to 141%	142 to 200%
Less than 40°C	16cpm	12cpm	12cpm	12cpm	12cpm	12cpm
40°C or more	16cpm	12cpm	8cpm	12cpm	12cpm	8cpm

Table 4-202a

- A4 Original, A4 Copy (NP7210)

Reading by cleaner thermistor (TH3)	Copy count at lower than 500			Copy count at 500 or more		
	50 to 100%	101 to 141%	142 to 200%	50 to 100%	101 to 141%	142 to 200%
Less than 40°C	21cpm	21cpm	16cpm	11cpm	11cpm	11cpm
40°C or more	21cpm	21cpm	11cpm	11cpm	11cpm	11cpm

Table 4-202b

F. Auto Density Adjustment (AE)

1. Outline

The copier is equipped with an automatic density adjustment mechanism (AE), which controls the developing DC bias to suit the density of originals. As long as the original is of even density, the AE mechanism is capable of ensuring copies free of fogging by changing the developing DC bias to suit the density of the original.

2. Measuring the Density of the Original

In initial rotation state (INTR), the scanning lamp (LA1) is turned on at a specific intensity and the scanner is moved forward 70 mm to expose the original. When the scanner has stopped, the light reflected by the area shown in Figure 4-208 (in reference to the original butting position) is measured by the AE sensor (photodiode), whose output is sent to the DC controller PCB as the AE sensor output signal (AE_DATA).

Based on the signal, the DC controller PCB computes the optimum level of the developing DC bias for copying, and sends the result to the high-voltage power supply PCB as the developing bias control signal (DV_DC_CNT).

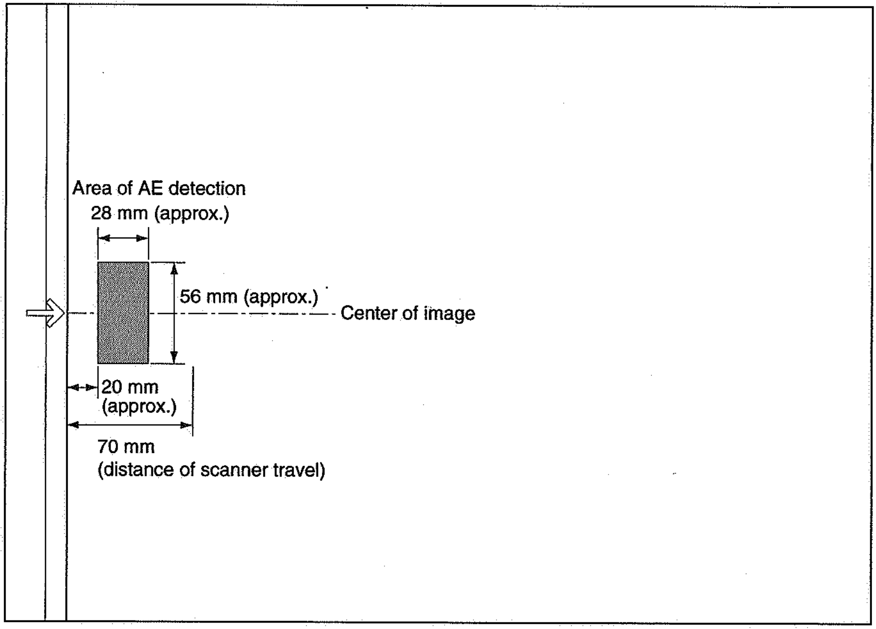


Figure 4-208

Figure 4-209 shows changes in the developing DC bias in relation to the density of different originals. If the density of the original is higher (darker) than the Test Sheet and lower (lighter) than a newspaper, the developing DC bias will vary between F5.0 and F7.5 in terms of Copy Density lever position.

If the original is lighter than the Test Sheet, copies are made at an F5.0 equivalent (-270 V); if it is darker than a newspaper, on the other hand, copies are made at an F7.5 equivalent (-400 V).

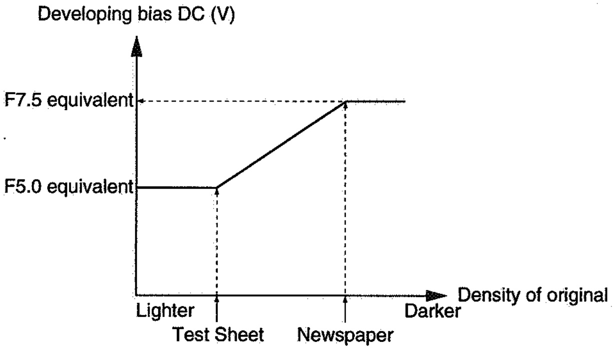


Figure 4-209

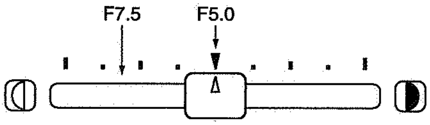


Figure 4-210

III. DISASSEMBLY/ASSEMBLY

The copier may be disassembled and assembled as shown here. Pay attention to the copier's mechanical characteristics along with the steps for disassembly/assembly.

Important:

1. Turn off the power and disconnect the power plug to ensure safety whenever disassembling/assembling the copier.
2. Unless otherwise noted, assemble the parts by reversing the steps used to disassemble them.
3. Identify the screws by type (length, diameter) to avoid use in the wrong location.
4. Use a washer where needed. The mounting screws used for the grounding wire and varistor come with a washer to ensure electric continuity. Do not forget to use these washers.
5. As a rule, do not operate the copier with any of its parts removed.
6. As screws with a broader pitch than those used in the other covers are used in the rear cover and other parts of the copier, never use screws in parts other than where they originally came from.

A. Scanning Lamp Assembly

1. Removing the Scanning Lamp

1) Remove the copyboard glass. (See .7-14)
2) Holding the bend [A], pull out the scanner as far as the cut-off [B].

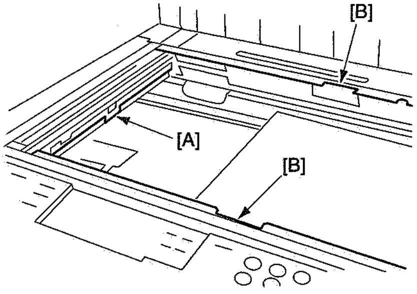


Figure 4-301

3) Remove the mounting screw [1], and remove the reflecting cover [2].

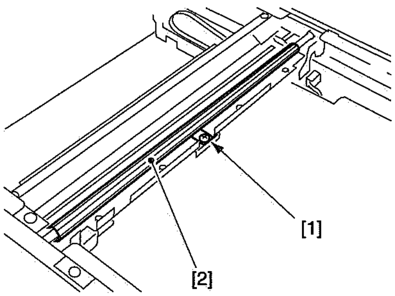


Figure 4-302

4) Wrap both ends of the scanning lamp [3] with lint-free paper. Then, remove the lamp while pushing toward the rear end.

Caution:
1. Do not work if the surface of the scanning lamp is hot.
2. Do not leave fingerprints on the surface of the scanning lamp.
3. If the surface of the scanning lamp is soiled, dry wipe it.
4. Do not leave fingerprints on the reflecting cover.
5. Do not deform the reflecting cover.

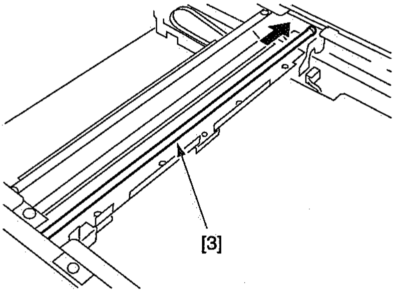


Figure 4-303

2. Mounting the Scanning Lamp

Mount the scanning lamp by reversing the steps used to remove it. However, keep the following in mind:

- Orient the scanning lamp so that the side with the shorter boss-to-terminal length is toward the rear.
- Orient the scanning lamp so that the boss is at the angle indicated in Figure 4-304.

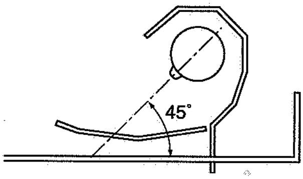


Figure 4-304

3. Removing the Thermal Fuse

1) Remove the scanning lamp.
2) Remove the two mounting screws[1], and remove the thermal fuse [2].

Caution:
Mount the thermal fuse by reversing the steps used to remove it. Be careful of the orientation of the fuse.

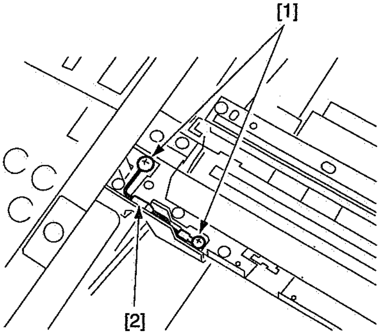


Figure 4-305

B. Exposure Assembly

1. Removing the Pre-Exposure/Blank Exposure Lamp Assembly

1) Remove the developing assembly. (See p.4-37)
2) Turn the toner supply lever to the pressure position, open the top of the main body and remove the drum unit. (See p.4-28)
3) Remove the inside over.
4) Disconnect the two connectors [1], and remove the mounting screw [2] ; then, remove the pre-exposure/blank exposure lamp assembly [3].

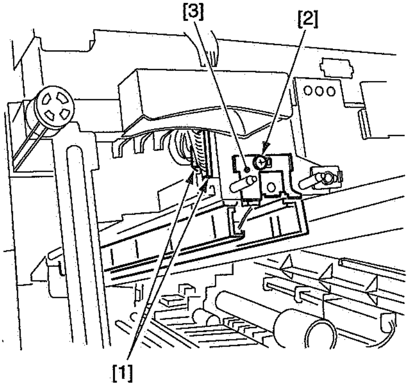


Figure 4-306

2. Removing the Dust-Proofing Glass

1) Remove the inside cover.
2) Remove the mounting screws [1], and remove the dust-proofing glass [2].

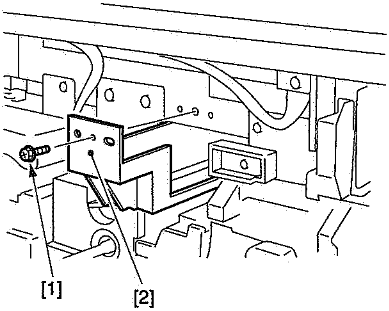


Figure 4-307

3. Cleaning the No. 6 Mirror

1) Remove the developing assembly. (See p. 4-37.)
2) Turn the toner supply lever to the pressure position, open the top of the main body and remove the drum unit. (See p. 4-28.)
3) Remove the dust-proofing glass. (See p. 4-26.)
4) Remove the mounting screw [1], and remove the developing assembly rail [2].

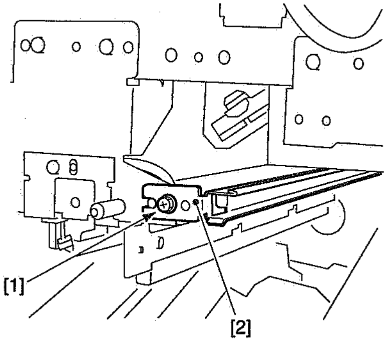


Figure 4-308

5) Clean the No. 6 mirror [3].

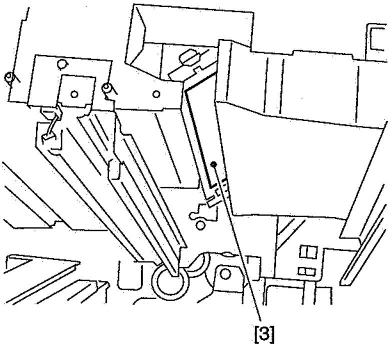


Figure 4-309

C. Drum Unit

1. Removing the Drum Unit

1) Open the top unit, release the developing assembly.
2) Remove the thumb screw [1], and slide out the drum unit [2] to the front to remove.

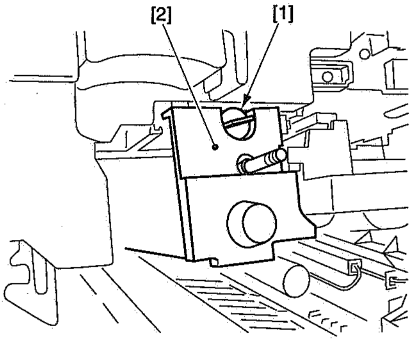


Figure 4-310

Caution:

- The photosensitive drum is susceptible to strong light. If it was subjected to strong light for a long time, it can cause copies to have white spots or black lines.
  Whenever you have taken out the drum unit from the copier, be sure to keep it in the bag used at time of installation. If the bag is not at hand, substitute several sheets of fresh copy paper to wrap the drum unit, and keep it in a dark place.
- When mounting the drum unit to the copier, be sure to slide it along the rails and work with extra care.

2. Cleaning the Photosensitive Drum

If the surface of the photosensitive drum is soiled, wipe it with a flannel cloth coated with toner.

Caution:

- Do not dry wipe the surface of the photosensitive drum. Do not use solvent.
- Do not use paper, lint-free or otherwise, to avoid damaging the surface of the photosensitive drum.
- Work briskly when cleaning the photosensitive drum to avoid unnecessarily subjecting it to light and thus affecting images.
- If you must rotate the photosensitive drum, be sure to rotate it in the same direction as it would when making copies.

3. Removing the Cleaner Thermistor

1) Remove the drum unit. (See p. 4-28.)
2) Remove the fixing assembly. (See p. 6-11.)
3) Disconnect the connector [1], and remove the mounting screw [2]; then, remove the cleaner thermistor [3].

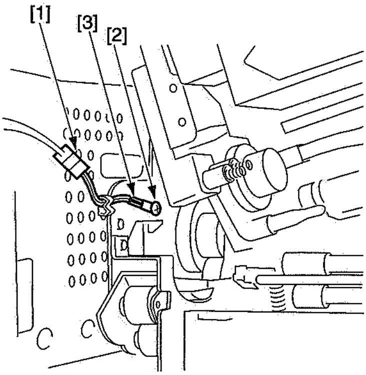


Figure 4-311

D. Primary Charging Assembly

1. Removing the Primary Charging Assembly

1) Remove the drum unit. (See p. 4-28.)
2) Pull the charging wire cleaning lever [1] slightly to the front.
3) Detach the hook [2], and detach the drum front cover [3].

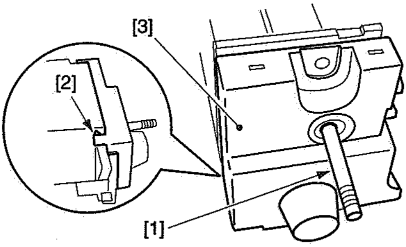


Figure 4-312

4) Remove the mounting screw [4], and remove the primary charging assembly [5].

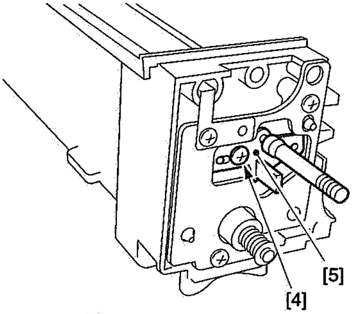


Figure 4-313

E. Transfer Charging Assembly

1. Removing the Transfer Charging Assembly

1) Open the copier top, and remove the front door.
2) Pull the charging wire cleaning lever [1] slightly to the front.
3) Remove the mounting screw [2], and lift the stopper [3] to remove.
4) Pull the transfer charging assembly [4] to the front to remove.

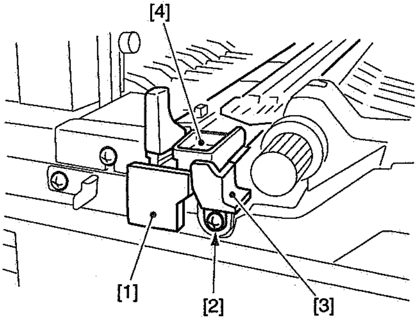


Figure 4-314

F. Charging Wire

1. Outline

As many as two charging wires are located around the photosensitive drum. (These charging wires are 0.06 mm in diameter.)

2. Stringing the Charging Wires

Basically, all charging wires are strung in the same way. (The following uses the primary charging wire as an example.)

1) Remove the mounting screw [1], and remove the stopper [2] and the grid plate [3].
   To remove the transfer charging assembly, remove the three hooks [a], and remove the guide wire plate [b].

- Primary Charging Assembly

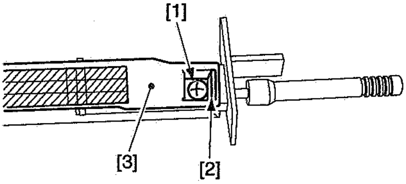


Figure 4-315a

- Transfer Charging Assembly

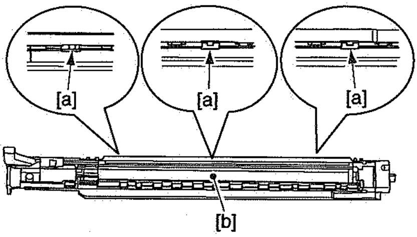


Figure 4-315b

2) Remove the sheet (front) [4] and the sheet (rear) [5].
   To remove the transfer charging assembly, remove the sheet (front) [c] and the sheet (rear) [d].

- Primary Charging Assembly

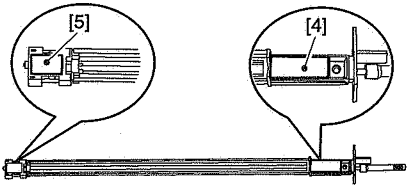


Figure 4-316a

- Transfer Charging Assembly

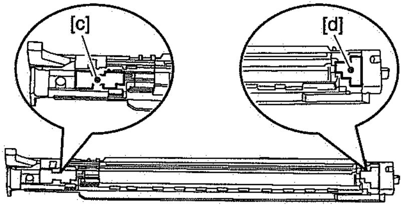


Figure 4-316b

3) Remove the spring [6], and remove the charging wire [7].
   To remove the transfer charging assembly, remove the spring [e] and the cushioning rubber [f], and remove the charging wire [g].

- Primary Charging Assembly

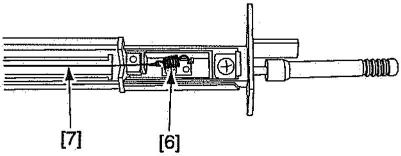


Figure 4-317a

- Transfer Charging Assembly

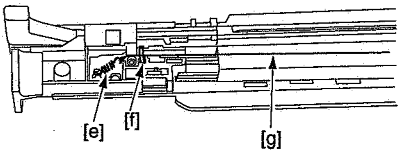


Figure 4-317b

4) Free a length of about 5 cm from the charging wire reel (0.06 mm wire).

Reference:

To form a loop, wind the charging wire around a hex key once, and turn the hex key three to four times; then, twist the charging wire.

5) Cut the end (excess) of the twisted charging wire with a nipper.
6) Hook the loop on the charging electrode at the rear.

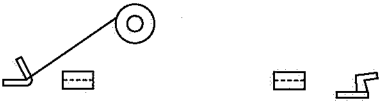


Figure 4-318

7) Hook the charging wire on the charging wire positioner at the rear, and hook the charging wire tension spring on the charging wire by the distance A; then, twist it.

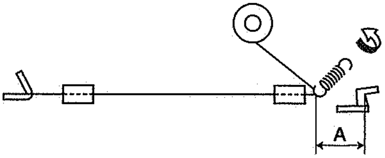


Figure 4-319

A:
Primary charging assembly : 13.0 ±0.5 mm
Transfer charging assembly : 12.0 ±0.5 mm

8) Cut the excess charging wire with a nipper.
9) Pick the end of the charging wire tensioning spring with tweezers, and hook it on the charging electrode.
   To install the transfer charging assembly, install the cushioning rubber.

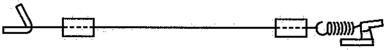
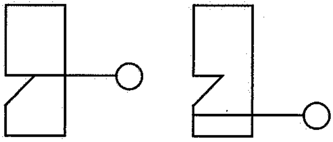


Figure 4-320

Note:

Go through the following:

- Be sure that the charging wire is free of bending and twisting, and its gold plating has not peeled.
- Be sure that the charging wire is in the V-groove of the charging wire positioner.



(correct) (wrong)

Figure 4-321

10) Wipe the charging wire with lint-free paper moistened with alcohol.

Caution:

- Do not use a cloth carrying metal powder for cleaning.
- Do not use a moist cloth for cleaning.
- Dry wipe with lint-free paper; then, mount only after making sure that alcohol has completely evaporated.

11) Mount the sheet (front) and the sheet (rear).
12) Mount the stopper and the grid plate.
    For the transfer charging assembly, mount the guide wire plate.

3. Adjusting the Height of the Charging Wires

To adjust each charging wire, turn its respective height adjusting screw. A full turn on the screw will change the height of the primary charging wire by about 0.5 mm and that of the transfer charging wire by about 0.7 mm.

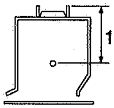
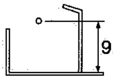
Charging assembly	Height of charging wire (mm)	Range
Primary	 11.0±0.2mm	±1.0mm
Transfer	 9.5±0.2mm	±1.0mm

Figure 4-322

- Primary Charging Assembly

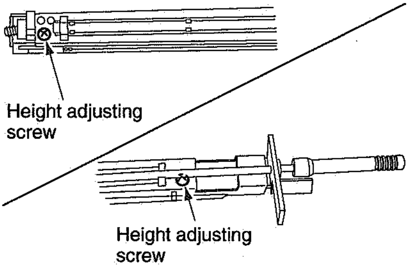

Height adjusting screw
Height adjusting screw

Figure 4-323a

- Transfer Charging Assembly

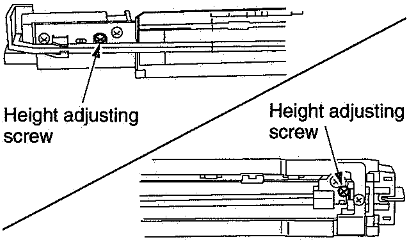

Height adjusting screw
Height adjusting screw

Figure 4-323b

G. Developing Assembly

1. Removing the Developing Assembly

1) Open the front door, and release the developing assembly.
2) Remove the mounting screw [1], and remove the stopper [2].
3) Pull the developing assembly [3] to remove.

Caution:
Take care not to damage the developing cylinder.

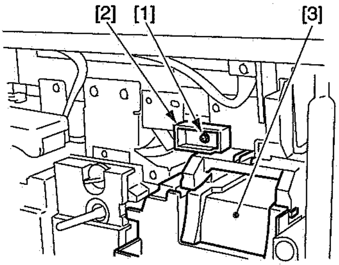


Figure 4-324

2. Removing the Developing Blade

1) Remove the developing assembly.
2) Remove the mounting screw [1] and the four hooks [2]; then, remove the developing front cover [3].

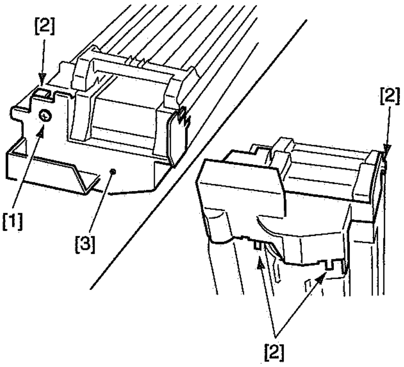


Figure 4-325

3) Remove the three mounting screws [4], and detach the developing blade cover [5].

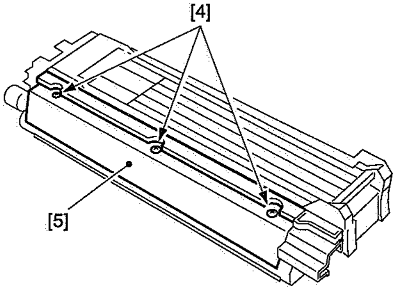


Figure 4-326

4) Lift the front of the developing upper cover [6] slightly, and slide it in the direction of the arrow to remove.

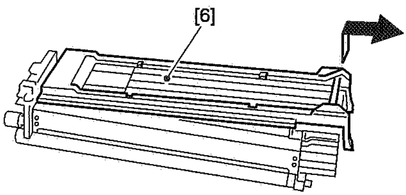


Figure 4-327

5) Place a newspaper or the like on the floor, and empty the developing assembly of toner.
6) Put copy paper between the developing blade and the developing cylinder.
7) Remove the two mounting screws [7], and remove the developing blade [8].

Caution:
When mounting the developing blade, be sure to put copy paper on the developing cylinder before mounting the developing blade so as to protect the cylinder.

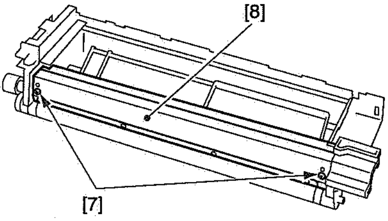


Figure 4-328

3. Removing the Developing Cylinder

1) Remove the developing blade. (See p. 4-37.)
2) Remove the mounting screw [1], and remove the magnet positioning plate [2].

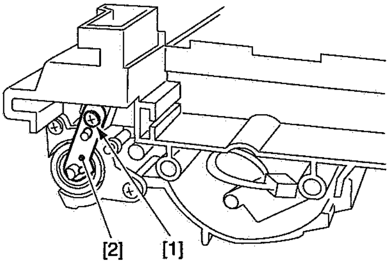


Figure 4-329

3) Remove the grip ring [3], and remove the developing roll [4].
4) Remove the two mounting screws [5], and remove the bearing holder (front) [6] and the bearing [7].

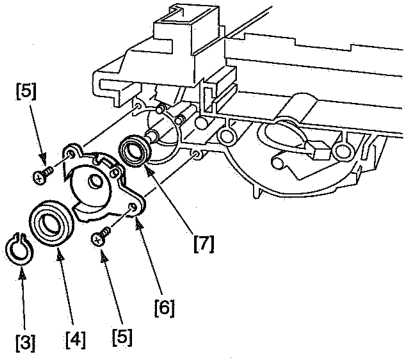


Figure 4-330

5) Remove the two mounting screws [8], and remove the gear support plate [9].

Caution:
Take extra care when removing the gear support plate. The gear will be freed.

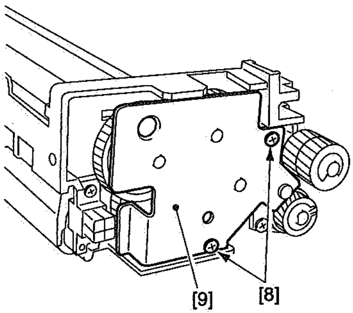


Figure 4-331

6) Remove the E-ring [10], and remove the gear [11].
7) Remove the grip ring [12], and remove the gear [13].
8) Remove the gear [14].

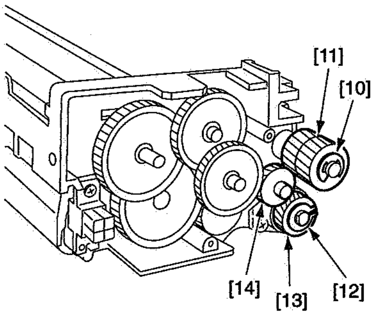


Figure 4-332

9) Remove the two mounting screws [15]; then, remove the bearing holder (rear) [16], bearing [17], and developing roll [18].

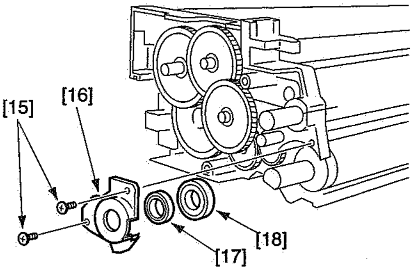


Figure 4-333

10) Remove the developing cylinder [19].

Caution

Do not leave fingerprints or oils on the surface of the developing cylinder. As necessary, dry wipe the surface with lint-free paper.

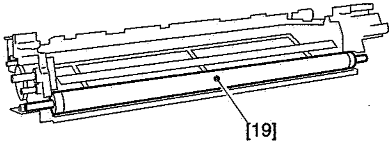


Figure 4-334

CHAPTER 5

PICK-UP/FEEDING SYSTEM

This chapter explains the principles used from when copy paper is picked up to when a copy is delivered in view of the functions of electrical and mechanical units and in relation to their timing of operation. It also shows how these units may be disassembled/assembled and adjusted.

- I. OUTLINE OF OPERATION 5-1
- II. PICK-UP FROM THE CASSETTE 5-2
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  - B. Sequence of Operations (pick-up/feeding) 5-3
  - C. Operation of the Cassette Lifter 5-5
  - D. Detecting the Size of the Cassette 5-7
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- V. DETECTING JAMS 5-13
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  - C. Registration Roller Assembly 5-24
  - D. Cassette Assembly 5-25

I. OUTLINE OF OPERATION

The copier uses a center reference feeding method, in which copy paper is moved along the center of the pick-up/feeding path to ensure stable movement.

The pick-up system consists of the cassette No. 1 holder and the multifeeder. Copy paper picked up from the cassette or the multifeeder is controlled by the registration roller so that it is aligned with the leading edge of the image on the photosensitive drum, and is sent through the transfer, separation, and fixing assemblies and then to the copy tray.

The copier is equipped with the following sensors to monitor feeding of the copy paper.

No.	Sensor	Description
PS5	Registration paper sensor	Detects delay/stationary jams, measures paper length.
PS6	Delivery paper sensor	Detects delay/stationary jams.
PS13*	Vertical path paper sensor	Detects interval between sheets

*NP7210 only

Table 5-101

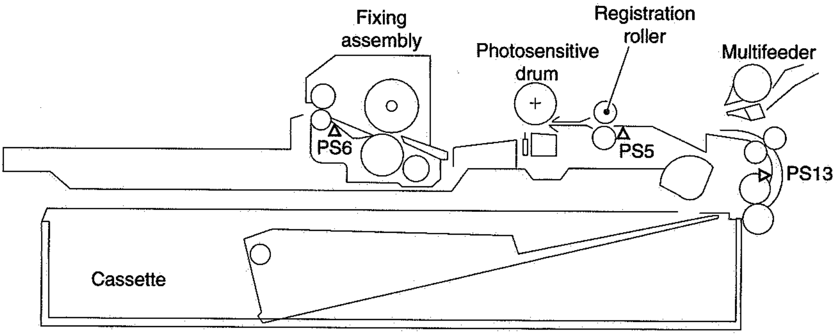


Figure 5-101

II. PICK-UP FROM THE CASSETTE

A. Pick-Up Operation

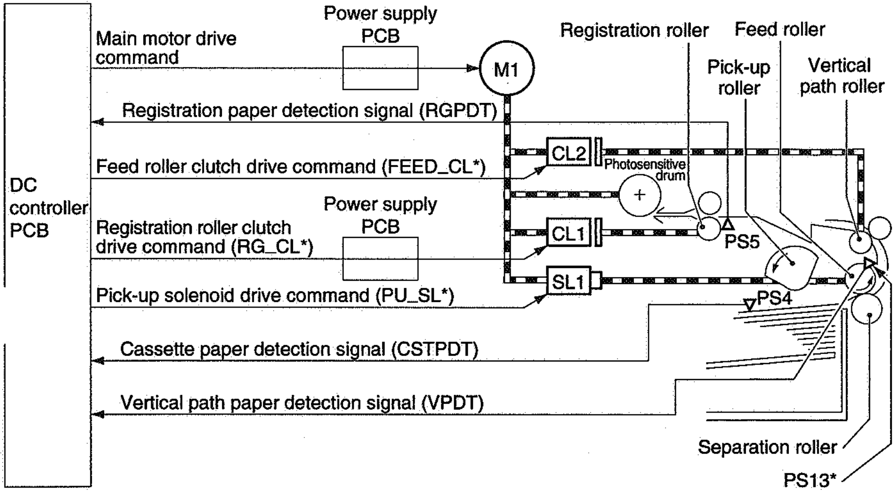
The pick-up roller and the feed roller are controlled by the pick-up solenoid (SL1).

The stack of copy paper inside the cassette is held up by the lifter, and the pick-up roller is controlled by the pick-up solenoid and is kept away from the surface of the stack.

When the pick-up solenoid turns on, the claws move away from the pick-up gear, and the drive of the main motor (M1) is transmitted to the pick-up roller and the feed roller.

A single sheet of copy paper is picked up and sent to the feed roller by the work of the pick-up roller and the separation claws. If multiple sheets should be picked up, the feed roller and the separation roller would serve to make sure that no more than a single sheet is sent forward to the vertical path roller.

The copy paper is then moved by the vertical path roller to the registration roller. In response, the registration roller controls the movement of the copy paper so that its leading edge matches the image on the photosensitive drum.


DC controller PCB
Main motor drive command
Power supply PCB
M1
Registration roller
Feed roller
Pick-up roller
Vertical path roller
Registration paper detection signal (RGPDT)
CL2
Photosensitive drum
Feed roller clutch drive command (FEED_CL*)
Power supply PCB
Registration roller clutch drive command (RG_CL*)
CL1
PS5
SL1
Pick-up solenoid drive command (PU_SL*)
PS4
Cassette paper detection signal (CSTPDT)
Vertical path paper detection signal (VPDT)
Separation roller
PS13*

*NP7210 only

Figure 5-201

B. Sequence of Operations (pick-up/feeding)

- **NP7161/NP7160 (A4, 2 Copies)**

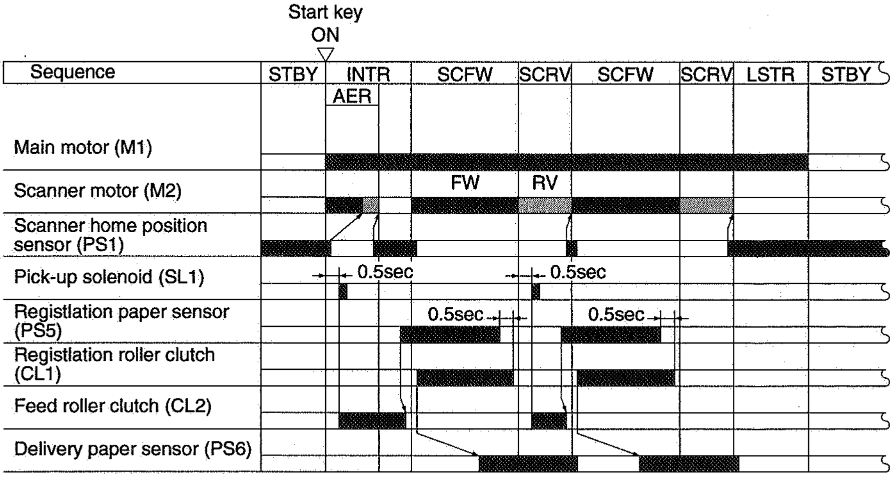

Start key
ON
Sequence
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
Main motor (M1)
Scanner motor (M2)
FW
RV
Scanner home position sensor (PS1)
Pick-up solenoid (SL1)
0.5sec
0.5sec
Registlation paper sensor (PS5)
0.5sec
0.5sec
Registlation roller clutch (CL1)
Feed roller clutch (CL2)
Delivery paper sensor (PS6)

Figure 5-202a

- **NP7210 (A4, 2 Copies)**

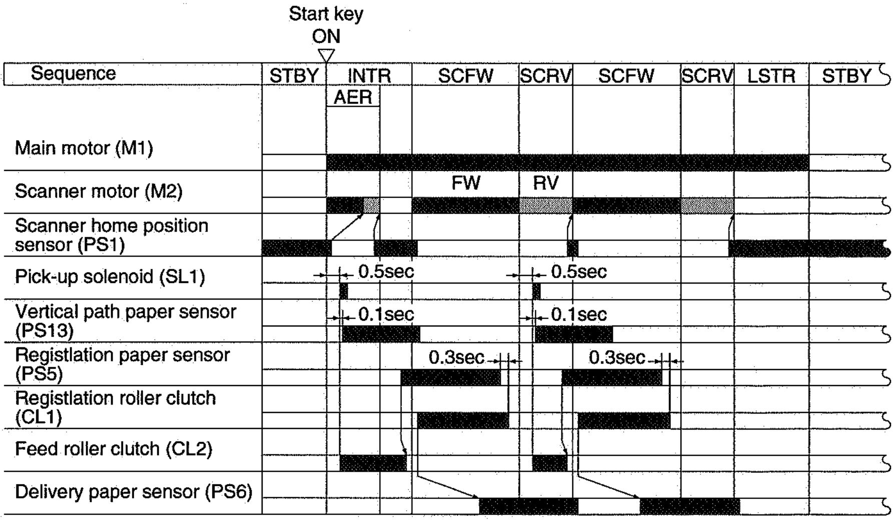

Start key
ON
Sequence
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
Main motor (M1)
Scanner motor (M2)
FW
RV
Scanner home position sensor (PS1)
Pick-up solenoid (SL1)
0.5sec
0.5sec
Vertical path paper sensor (PS13)
0.1sec
0.1sec
Registlation paper sensor (PS5)
0.3sec
0.3sec
Registlation roller clutch (CL1)
Feed roller clutch (CL2)
Delivery paper sensor (PS6)

Figure 5-202b

Compared with models NP7161 and NP7160, the NP7210 has a shorter interval time between copies.

For this reason, jamming may occur during continuous copying if the next sheet of paper to be picked up stops in a position where it is protruding from the cassette in the preceding pick-up operation, and there is no interval between the leading edge of this sheet and the trailing edge of the previous sheet in the next pick-up operation. To prevent this from happening, the copier is equipped with a vertical path paper sensor (PS13).

If the next sheet activates the sensor (PS13) in the preceding pick-up operation, feeding of the next sheet is delayed in order to ensure an interval after the previous sheet.

NP7210 Vertical Path Paper Control (A4, 2 sheets)

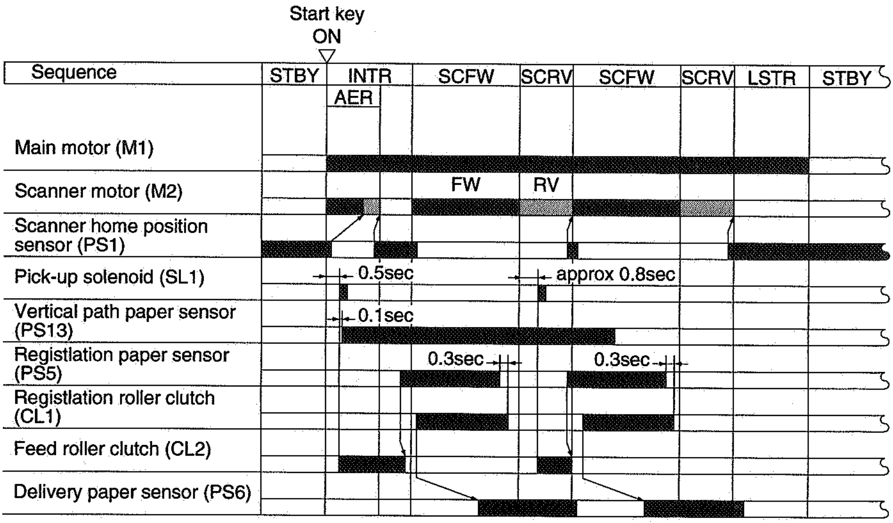

Start key
ON
Sequence
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
Main motor (M1)
Scanner motor (M2)
FW
RV
Scanner home position sensor (PS1)
Pick-up solenoid (SL1)
0.5sec
approx 0.8sec
Vertical path paper sensor (PS13)
0.1sec
Registlation paper sensor (PS5)
0.3sec
0.3sec
Registlation roller clutch (CL1)
Feed roller clutch (CL2)
Delivery paper sensor (PS6)

Figure 5-203

C. Operation of the Cassette Lifter

When the cassette is pushed inside the copier, the lifter stopper will be freed, and the lifter will move up by the force of a spring. At this time, the copy paper will push up the paper detecting lever of the cassette paper sensor (PS4) to enable detection of the presence/absence of copy paper.

The rear end guide plate is slid in conjunction with the upward movement of the lifter to improve pick-up performance.

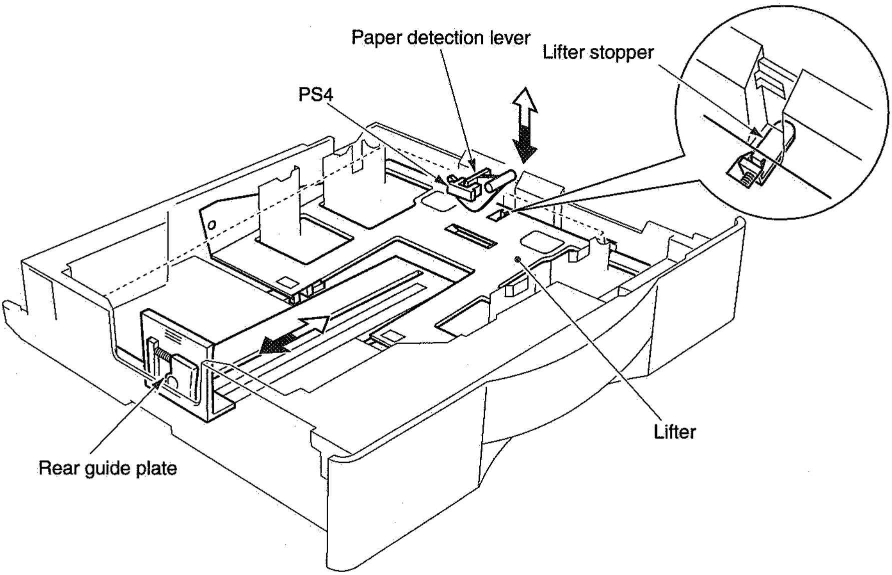

Paper detection lever
Lifter stopper
PS4
Lifter
Rear guide plate

Figure 5-204

The copier's cassette is designed to apply auxiliary pressure on paper of B4 or wider. The auxiliary tension spring acts on the lifter through the cut-off in the bottom of the cassette when the side guide plate is slid to the outside. In the case of paper narrower than B4, the spring remains slack and therefore does not act on the lifter.

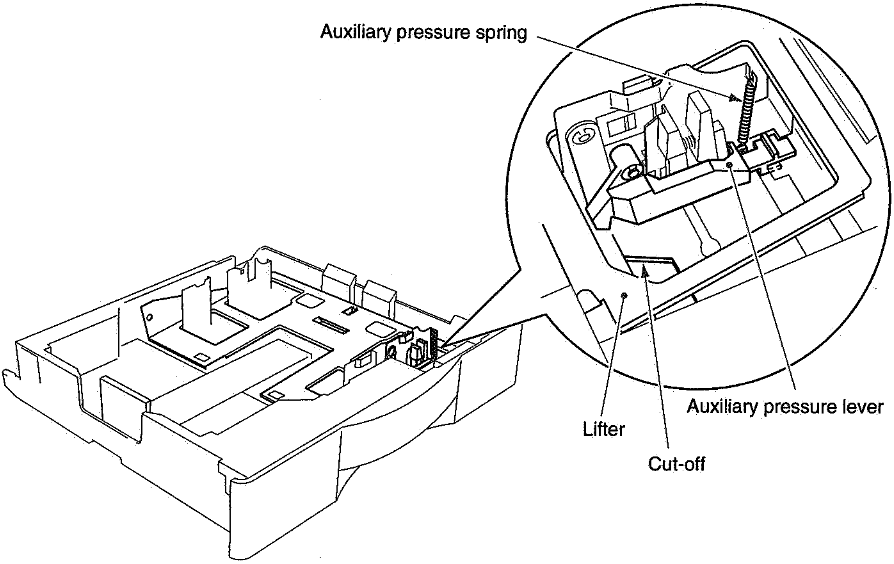

Auxiliary pressure spring
Auxiliary pressure lever
Lifter
Cut-off

Figure 5-205

D. Detecting the Size of the Cassette

1. Outline

The presence of paper and the size of paper inside the cassette are checked by the cassette size switch PCB mounted to the left of the cassette slot.

When the cassette is set in the copier, the cassette paper size switching block and the AB/Inch switching block act on the cassette size switch PCB to enable detection of the presence/absence of a cassette and the size of paper inside it.

The cassette paper size switching block slid to the front and rear by the work of the cam linked to the cassette paper size dial, causing the cassette paper size switching block to turn on/off the cassette size switch PCB.

The AB/Inch switching block, on the other hand, turns on/off the switch on the cassette size switch PCB according to how it is positioned. (The AB and Inch size notations are switched over by sliding the AB/Inch switching lever.)

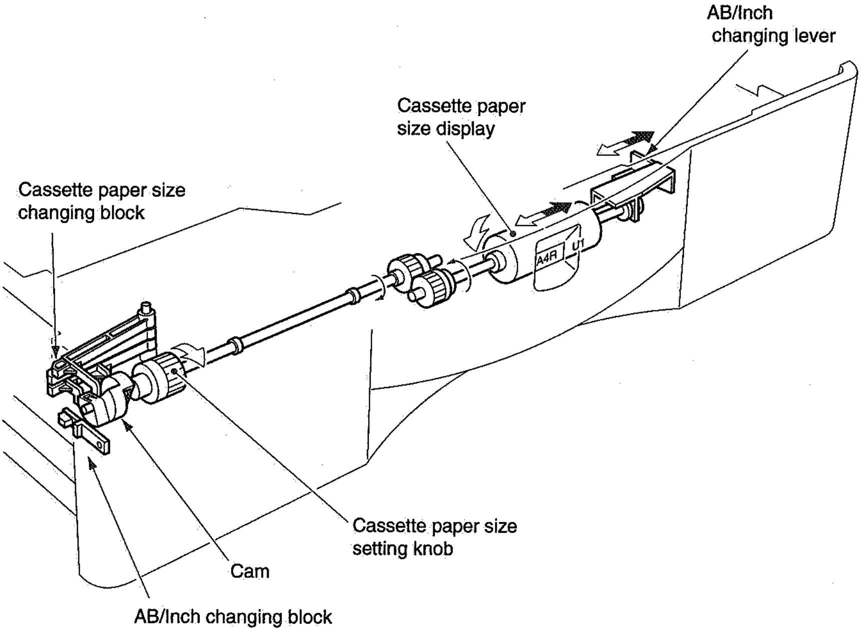

AB/Inch changing lever
Cassette paper size display
Cassette paper size changing block
A4R
U1
Cassette paper size setting knob
Cam
AB/Inch changing block

Figure 5-206

2. Detecting the Cassette Size

The AB configuration and the Inch configuration are distinguished by the switch (SW654) on the cassette switching PCB.

The size of the paper inside the cassette is identified with reference to the states (on/off) of the switches (SW651 through 653) on the cassette size switch PCB.

Table 5-201 shows the combinations used to identify specific paper sizes.

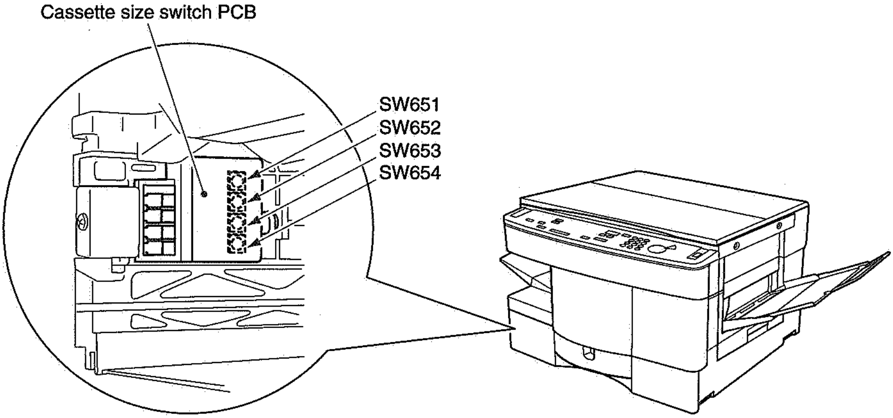


Figure 5-207

•AB size (SW654=0)

Result of detection	SW651	SW652	SW653
No cassette	0	0	0
B5	1	0	0
A4	0	1	0
A3	1	1	0
B5R	0	0	1
B4	1	0	1
A4R	0	1	1
No cassette	1	1	1

•Inch size (SW654=1)

Result of detection	SW651	SW652	SW653
No cassette	0	0	0
LGL	1	0	0
U2*	0	1	0
LDR	1	1	0
LTR	0	0	1
LTR-R	1	0	1
U1*	0	1	1
No cassette	1	1	1

*Non-AB/Inch configuration sizes may be registered (default sizes only) in service mode [5].

Table 5-201

III. PICK-UP FROM THE MULTIFEEDER

A. Pick-Up Operation

The presence/absence of copy paper in the multifeeder is detected by the multifeeder paper sensor (PS7).

When the multifeeder is selected and the Start key is pressed, the multifeeder solenoid (SL2) turns on to butt the paper guide plate against the multifeeder pick-up roller.

Then, the multifeeder roller clutch (CL3) turns on to transmit the drive of the main motor (M1) to the multifeeder pick-up roller. A single sheet of copy paper is picked up from the stack by the work of the multifeeder pick-up roller and the separation pad, and is sent to the registration roller.

This sequence of operations is repeated for each pick-up operation.

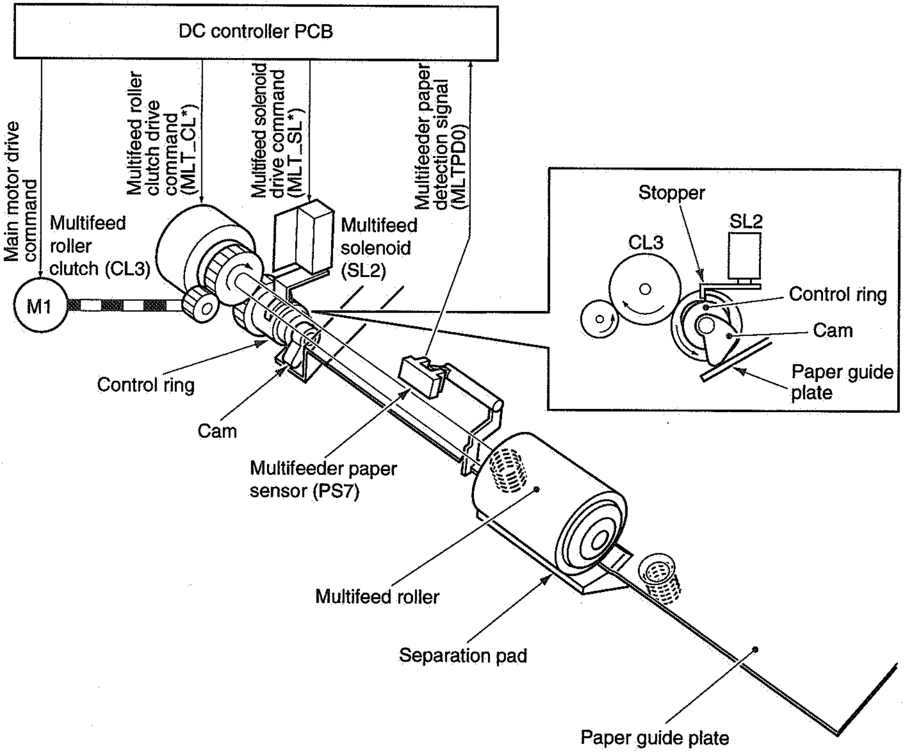

DC controller PCB
Main motor drive command
Multifeed roller clutch drive command (MLT_CL*)
Multifeed solenoid drive command (MLT_SL*)
Multifeeder paper detection signal (MLTPD0)
Multifeed roller clutch (CL3)
M1
Multifeed solenoid (SL2)
Control ring
Cam
Multifeeder paper sensor (PS7)
Multifeed roller
Separation pad
Paper guide plate
Stopper
SL2
CL3
Control ring
Cam
Paper guide plate

Figure 5-301

B. Detecting the Size of Paper in the Multifeeder

When the user sets the slide guide of the multifeeder to the width of copy paper, the multifeeder paper width sensor 1 (PS9) and the multifeeder paper width sensor (PS10) operating in conjunction with the movement of the side guide detect the width of the copy paper.

The identified width is used for blank exposure and fixing temperature control. The length of copy paper in multifeeder mode is detected with reference to how long the registration paper sensor (PS5) remains on.

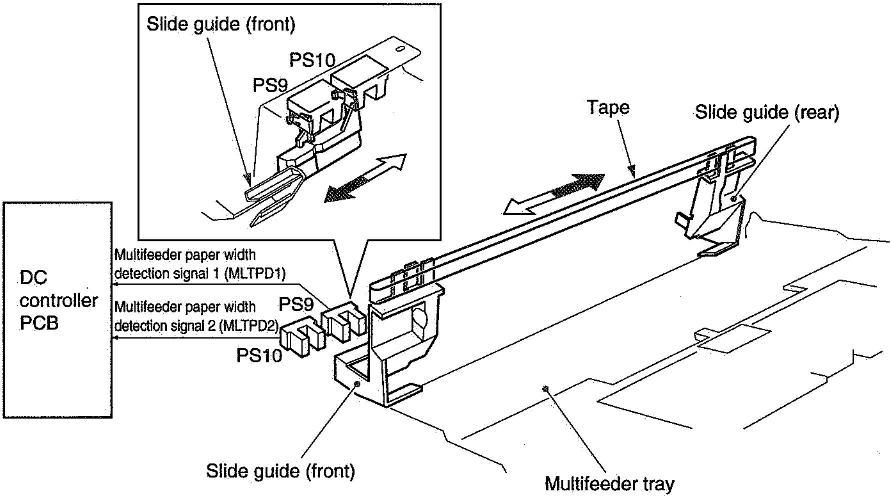

Slide guide (front)
PS10
PS9
Tape
Slide guide (rear)
DC controller PCB
Multifeeder paper width detection signal 1 (MLTPD1)
Multifeeder paper width detection signal 2 (MLTPD2)
PS9
PS10
Slide guide (front)
Multifeeder tray

Figure 5-302

Paper width (paper size)		PS9	PS10
Paper width > 257mm	(A3, A4, 11"x17", LTR)	0	1
257mm ≧ Paper width > 216mm	(B4, B5)	1	1
216mm ≧ Paper width > 182mm	(A4R, A5, LGL, LTRR)	1	0
182mm ≧ Paper width	(B5R, A5R, STMTR)	0	0

Table 5-301

C. Sequence of Operations (pick-up from multifeeder)

- **A4, 2 Copies**

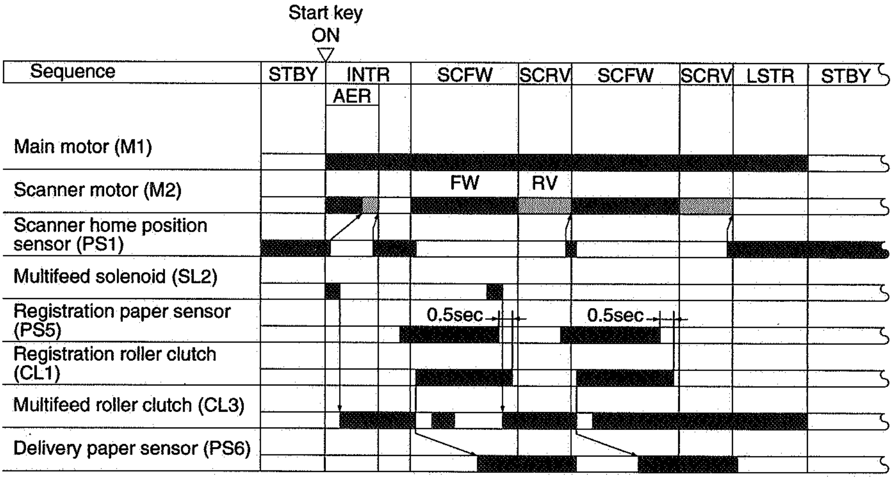
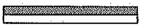
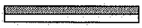
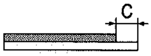
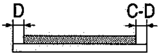

Start key
ON
Sequence
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
Main motor (M1)
Scanner motor (M2)
FW
RV
Scanner home position sensor (PS1)
Multifeed solenoid (SL2)
Registration paper sensor (PS5)
0.5sec
0.5sec
Registration roller clutch (CL1)
Multifeed roller clutch (CL3)
Delivery paper sensor (PS6)

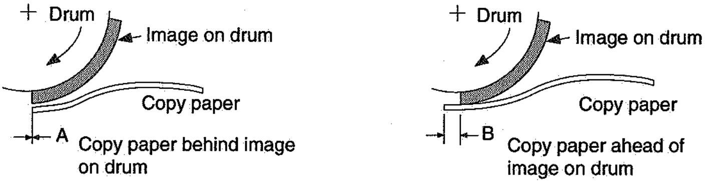
Figure 5-303

IV. CONTROLLING THE REGISTRATION CLUTCH

The registration clutch exerts the following control so as to match copy paper with the image on the photosensitive drum at a specific location.

Selected copy mode		Control timing	Image area on copy paper	Remarks
Standard copying		A		
Page separation		A		
Fit to page	Centering OFF	A		The size of margin C varies to suit the selected reproduction ratio and copy paper size. The size of margin D is 21.6 mm maximum.
	Centering ON	B		

▭ Copy paper ▨ Image area



Drum
Image on drum
Copy paper
A
Copy paper behind image on drum
Drum
Image on drum
Copy paper
B
Copy paper ahead of image on drum

Figure 5-401

If centering is turned on in Fit Page mode, control is exerted so that half of the trailing edge C resulting in relation to the selected reproduction ratio and copy paper size will be the leading edge margin. The maximum leading edge margin in such cases, however, is 21.6 mm.

If centering is turned off in Fit Page mode, control is exerted so that the leading edge of copy paper and the leading edge of the image on the photosensitive drum match.

V. DETECTING JAMS

A. Outline

The copier is equipped with the following two sensors used to check the movement of copy paper.

- Registration paper sensor (PS5)
- Delivery paper sensor (PS6)

Jams are identified in relation to the presence/absence of copy paper over each sensor at such times as programmed in the microprocessor. As soon as a jam is identified, the microprocessor will immediately stop the operation, and flash the Jam indicator on the control panel.

The microprocessor identifies any of the following conditions as a jam:

a. Paper exists over a specific sensor at power-on, at end of warm-up, or during standby (power-on jam).

b. Paper fails to reach a specific sensor within a specific period of time (delay jam).
   1. Registration delay jam detected by the registration paper sensor (PS5).
   2. Delivery delay jam detected by the delivery paper sensor (PS6).

c. Paper does not move past a specific sensor within a specific period of time (stationary jam).
   1. Registration stationary jam detected by the registration paper sensor (PS5).
   2. Delivery paper stationary jam detected by the delivery paper sensor (PS6).

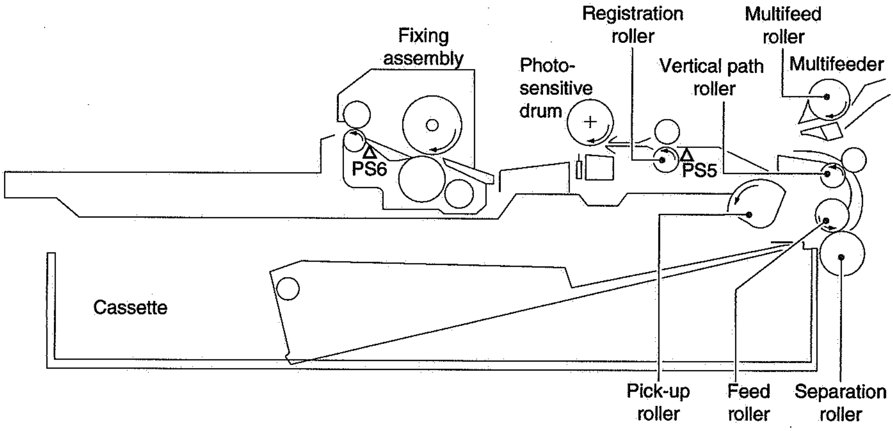

Fixing assembly
Registration roller
Multifeed roller
Photo-sensitive drum
Vertical path roller
Multifeeder
PS6
PS5
Cassette
Pick-up roller
Feed roller
Separation roller

Figure 5-501

B. Sequence of Operations (jam detection)

1. Registration Delay Jam

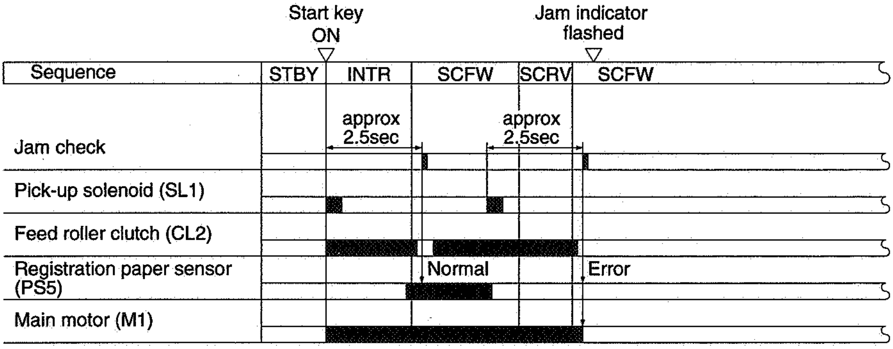
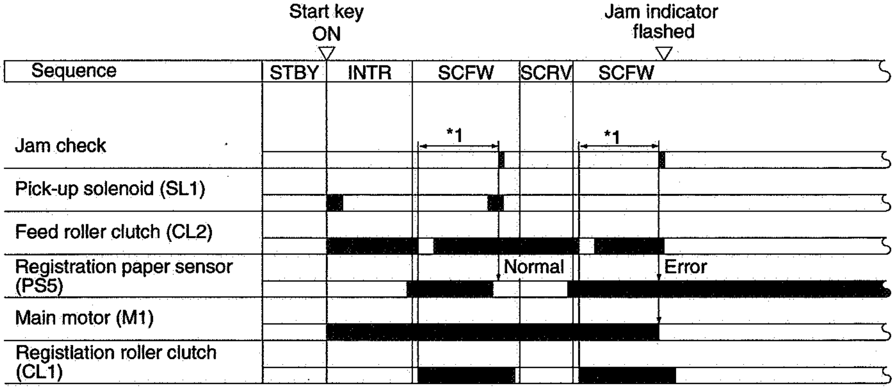

Start key ON
Jam indicator flashed
Sequence
STBY
INTR
SCFW
SCRV
SCFW
Jam check
approx 2.5sec
approx 2.5sec
Pick-up solenoid (SL1)
Feed roller clutch (CL2)
Registration paper sensor (PS5)
Normal
Error
Main motor (M1)

Figure 5-502

2. Registration Stationary Jam


Start key ON
Jam indicator flashed
Sequence
STBY
INTR
SCFW
SCRV
SCFW
Jam check
*1
*1
Pick-up solenoid (SL1)
Feed roller clutch (CL2)
Registration paper sensor (PS5)
Normal
Error
Main motor (M1)
Registlation roller clutch (CL1)

*1:Varies according to paper size.

Figure 5-503

3. Delivery Delay Jam

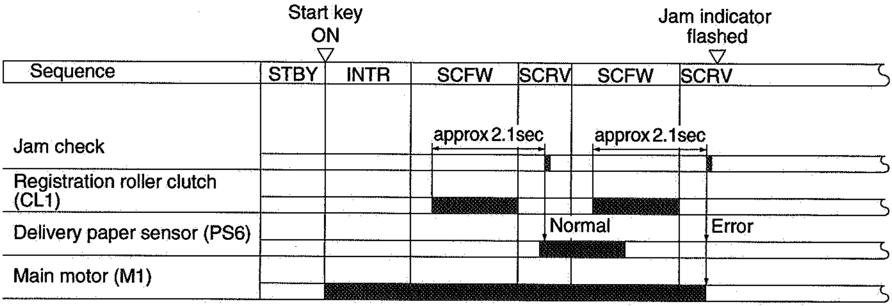

Start key ON
Jam indicator flashed
Sequence
STBY
INTR
SCFW
SCRV
SCFW
SCRV
Jam check
approx 2.1sec
approx 2.1sec
Registration roller clutch (CL1)
Delivery paper sensor (PS6)
Normal
Error
Main motor (M1)

Figure 5-504

4. Delivery Stationary Jam

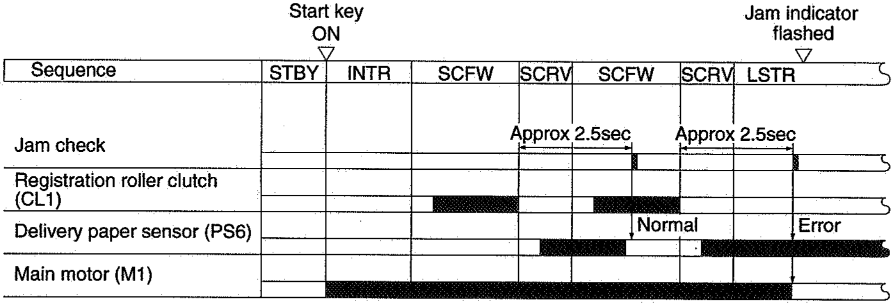

Start key ON
Jam indicator flashed
Sequence
STBY
INTR
SCFW
SCRV
SCFW
SCRV
LSTR
Jam check
Approx 2.5sec
Approx 2.5sec
Registration roller clutch (CL1)
Delivery paper sensor (PS6)
Normal
Error
Main motor (M1)

Figure 5-505

VI. DISASSEMBLY/ASSEMBLY

The copier may be disassembled and assembled as shown here. Pay attention to the copier's mechanical characteristics along with the steps for disassembly/assembly.

Important:

1. Turn off the power and disconnect the power plug to ensure safety whenever disassembling/assembling the copier.
2. Unless otherwise noted, assemble the parts by reversing the steps used to disassemble them.
3. Identify the screws by type (length, diameter) to avoid use in the wrong location.
4. Use a washer where needed. The mounting screws used for the grounding wire and varistor come with a washer to ensure electric continuity. Do not forget to use these washers.
5. As a rule, do not operate the copier with any of its parts removed.
6. As screws with a broader pitch than those used in the other covers are used in the rear cover and other parts of the copier, never use screws in parts other than where they originally came from.

A. Pick-Up Assembly

1. Removing the Pick-Up Roller

1) Remove the cassette.
2) Remove the stepped screw [1], and pull the roller support plate [2] to the front to remove.
3) Remove the pick-up roller assembly [3].

Caution:

When removing the pick-up roller assembly, take care not to lose the seat [4] at the back of the connector.

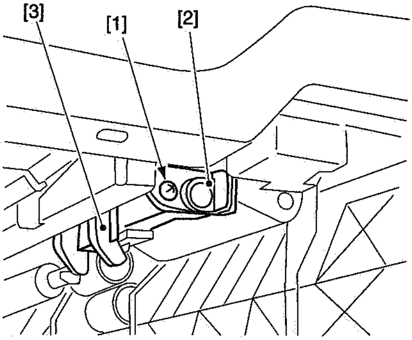


Figure 5-601

4) Push the section indicated by an arrow, and remove the two pick-up rollers [5].

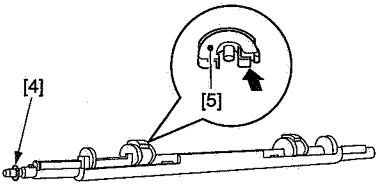


Figure 5-602

2. Mounting the Pick-Up Roller

Mount the pick-up roller by reversing the steps used to remove it and with the following in mind:

- Match the boss on the pick-up roller and the cut-off in the holder.
- Do not detach the rubber section of the pick-up roller.
- When mounting the pick-up roller assembly to the copier, be sure to position it securely face up.

3. Removing the Pick-Up Drive Assembly

1) Remove the registration roller assembly. (See p. 5-24.)
2) Remove the E-ring [1], and slide the vertical path roll [2] in the direction of the arrow.
3) Remove the bushing [3], and then vertical path roller [2] together with the gear [4].

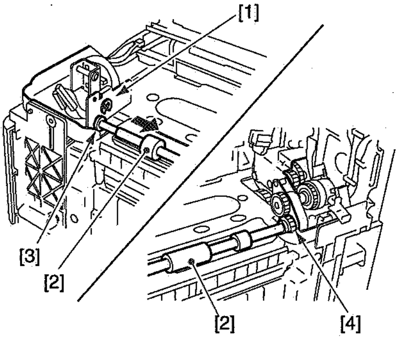


Figure 5-603

4) Remove the four mounting screws [5], and remove the pick-up drive assembly [6].

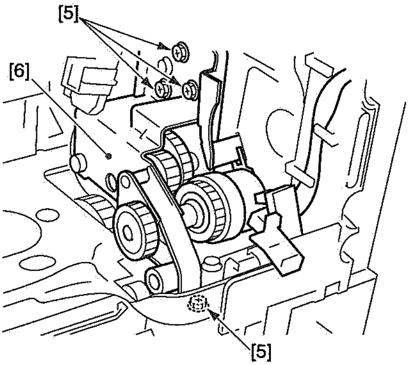


Figure 5-604

4. Removing the Pick-Up Assembly

1) Remove the separation roller assembly. (See p. 5-19.)
2) Remove the registration roller assembly. (See p. 5-24.)
3) Disconnect the connector [1], and remove the two screws [2].

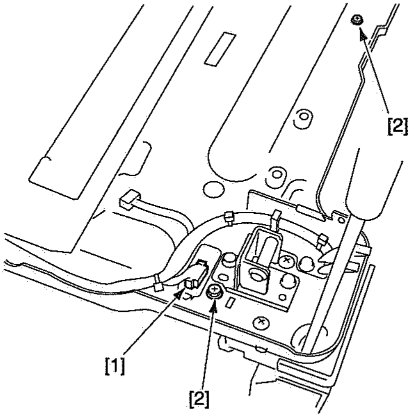


Figure 5-605

4) Slide the pick-up assembly [3] to the rear, and remove the hook.

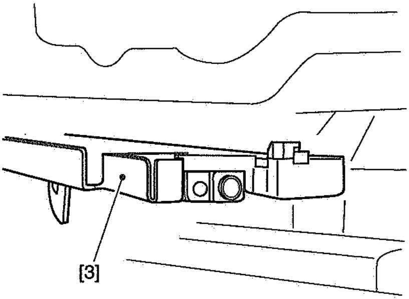


Figure 5-606

5. Removing the Feed Roller

1) Remove the separation roller assembly.
2) While holding the claw [A], move the feed roller [2] in the direction of the arrow to remove.

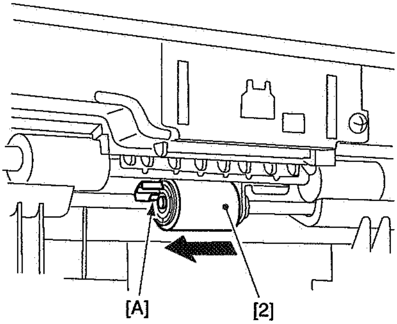


Figure 5-607

6. Removing the Separation Roller

1) Remove the cassette.
2) Remove the paper guide. (See p.7-10)
3) Remove the two mounting screws [1], and remove the separation roller assembly [2].

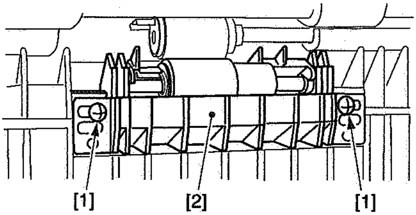


Figure 5-608

4) Remove the roller cover [3].

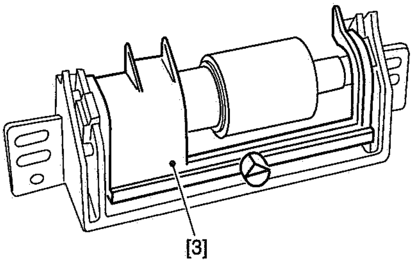


Figure 5-609

5) Remove the two bushings [4], and remove the two springs [5].

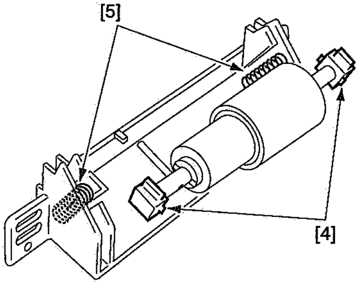


Figure 5-610

6) While pushing the claw [A] with a flat-blade screwdriver, remove the separation roller [6].

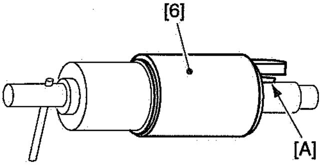


Figure 5-611

7. Mounting the Separation Roller

Mount the separation roller by reversing the steps used to remove it and with the following in mind:

- When mounting the separation roller, be sure to fit the pin [1] in the groove [2] of the holder.
- When mounting the roller cover, be sure so that the roller cover will push against the bushing.

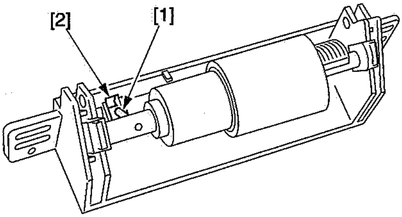


Figure 5-612

B. Multifeeder Assembly

1. Removing the Multifeeder Tray

1) Open the multifeeder tray, and remove the face cover [1] using a flat-blade screwdriver.

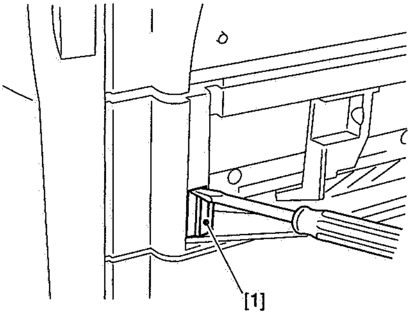


Figure 5-613

2) Remove the guide pin [2], and remove the multifeeder tray [3].

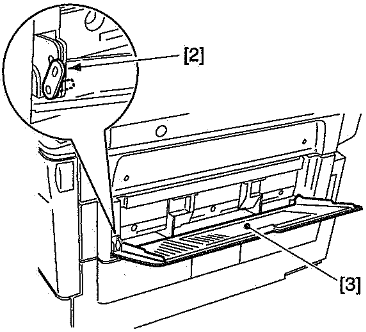


Figure 5-614

2. Removing the Multifeeder Assembly

1) Remove the rear cover, and open the right door.
2) Remove the lower inside cover. (See p.7-12.)
3) Disconnect the two connectors [1], and remove the mounting screw [2].

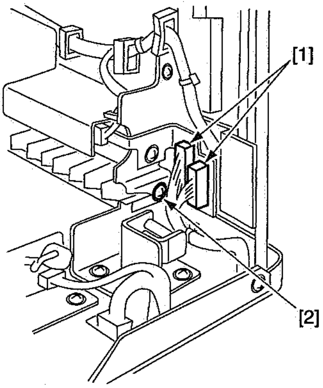


Figure 5-615

4) Disconnect the two connectors [3], and remove the three mounting screws [4]; then, detach the multifeeder assembly [5].

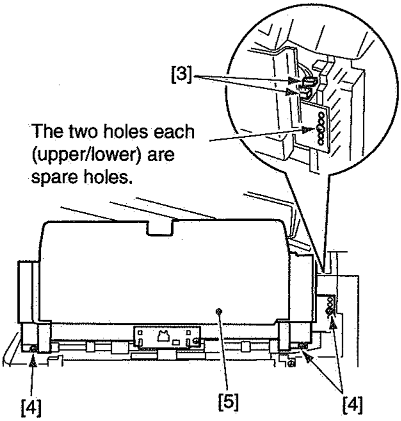


Figure 5-616

3. Removing the Multifeeder Pick-Up Roller

1) Remove the developing assembly. (See p. 4-37.)
2) Turn the toner supply lever to the pressure position, open the top of the main body and remove the drum unit. (See p. 4-28.)
3) Remove the E-ring [1]; then, while pushing down the multifeeder separation pad [2] to free it from pressure, detach the multifeeder pick-up roller [3].

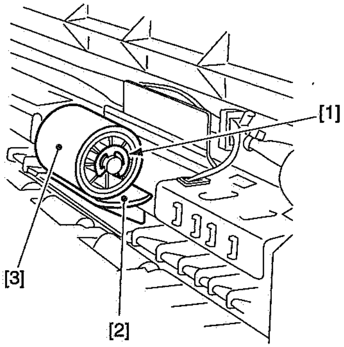


Figure 5-617

4. Removing the Separation Pad

1) Execute service mode 402 (multifeeder holding plate release) in standby state so as to lift the multifeeder holding plate [1].

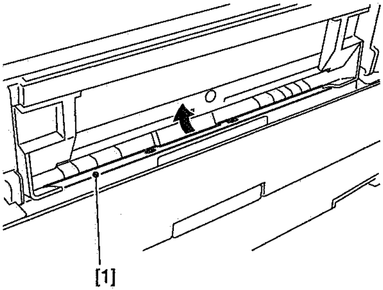


Figure 5-618

2) Turn off the copier, and disconnect the power plug.

Caution:
Whenever you need to perform disassembly/assembly work, be sure to turn off the copier and disconnect its power plug.

3) Open the right door.
4) Remove the mounting screw [2], and slide the multifeeder separation pad assembly [3] in the direction of the arrow to remove.

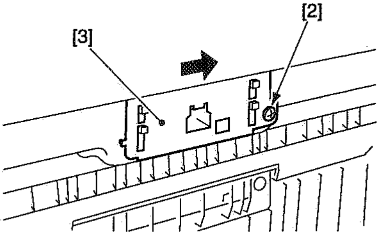


Figure 5-619

5) Detach the multifeeder separation pad [5] from the holder [4].

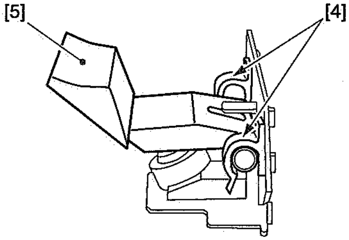


Figure 5-620

5. Adjusting the Pressure of the Separation Pad

If double feeding or pick-up failure occurs, loosen the adjusting screw [1] and relocate the holder [2] to adjust the force of the separation pad tension spring.

- If pick-up failure occurs, move the holder in the direction of [A].
- If double feeding occurs, move the holder in the direction of [B].

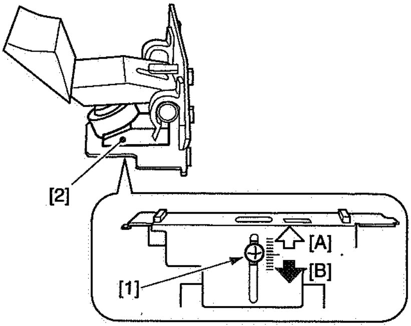


Figure 5-621

C. Registration Roller Assembly

1. Removing the Registration Roller Assembly

1) Remove the developing assembly. (See p. 4-37.)
2) Turn the toner supply lever to the pressure position, open the top of the main body and remove the drum unit. (See p. 4-28.)
3) Remove the multifeeder assembly. (See p. 5-21.)
4) Disconnect the connector [1], and remove the grip right [2]; then, detach the registration roller clutch [3].

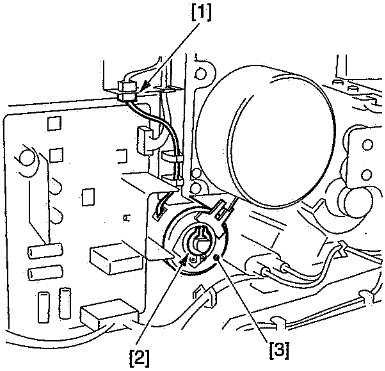


Figure 5-622

5) Disconnect the connector [4], and remove the three mounting screws [5]; then, detach the registration roller assembly [6].

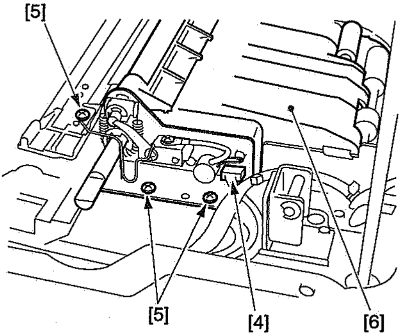


Figure 5-623

D. Cassette Assembly

1. Removing the Cassette Size Switch

1) Remove the cassette.
2) Remove the delivery lower cover. (See p.7-11)
3) Disconnect the connector [1] (J110) of the DC controller PCB, and remove the mounting screw [2] ; then, free the harness from the harness guide.

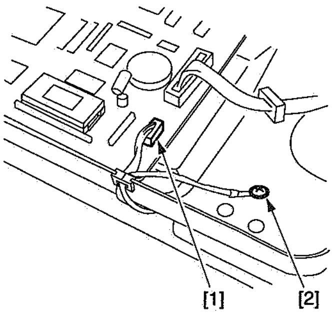


Figure 5-624

4) Remove the mounting screw [3], and remove the stopper [4].
5) Remove the cassette switch assembly [5].

Caution:
When removing the cassette switch assembly, take care not to lose the five spacers [6].

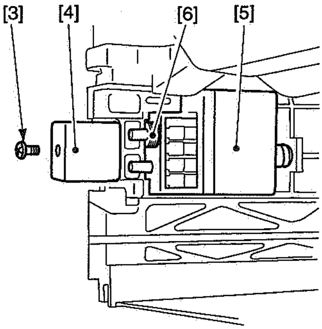


Figure 5-625

6) Remove the hook [7], and remove the cassette size switch [8].

Caution:
When mounting the cassette size switch assembly, check to make sure that the cassette size switch assembly slides normally by the work of the spring [9] pressure.

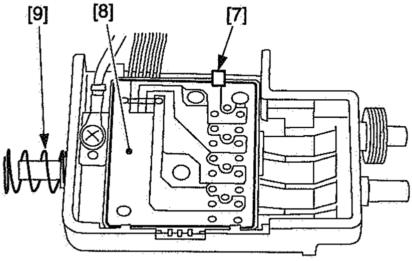


Figure 5-626

2. Changing the Cassette Size (AB/INCH)

1) Slide out the cassette.
2) Loosen the mounting screw [1] on the left side of the cassette; then, slide the size switching block [2] to the desired size position, and fix it in place.

• AB

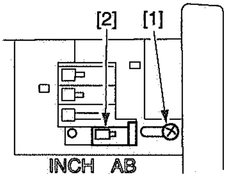


Figure 5-627a

• INCH

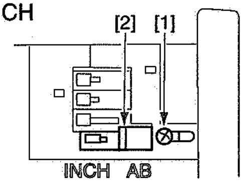


Figure 5-627b

3) Remove the mounting screw [3]; then, slide the size switching lever [4] to the desired size position, and fix it in place.

• AB

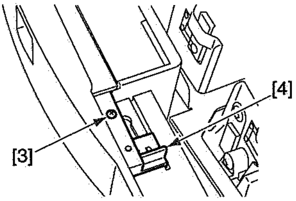


Figure 5-628a

• INCH

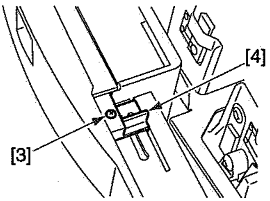


Figure 5-628b

4) Remove the mounting screw [5]; then, change the mount position of side guide block [6] to the desired size position, and fix it in place.

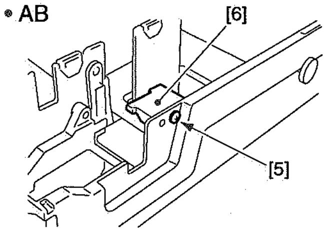


Figure 5-629a

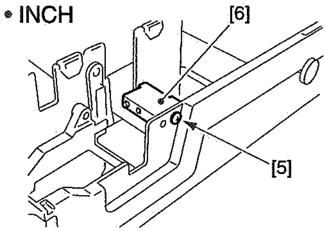


Figure 5-629b

3. Adjusting the Left/Right Registration

Turn the adjusting screw [1] until the cassette locking lever plate [2] and the cassette locking lever [3] engage.

When the adjusting screw [1] is turned clockwise, the cassette locking plate moves to the front.

When the adjusting screw [1] is turned counterclockwise, the cassette locking lever plate [2] moves to the rear.

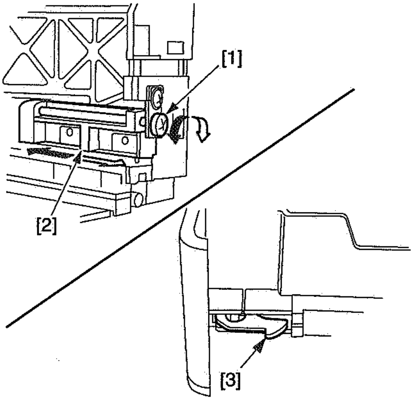


Figure 5-630

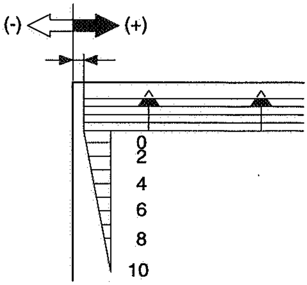


Figure 5-631

CHAPTER 6

FIXING SYSTEM

This chapter explains the principles used to fuse toner images to transfer medium in view of the functions of electrical and mechanical units and in relation to their timing of operation. It also shows how these units may be disassembled/assembled and adjusted.

I. OUTLINE OF OPERATION 6-1
  A. Outline 6-1
  B. Controlling the Fixing Temperature ... 6-2
  C. Error Detection Circuit 6-8

II. DISASSEMBLY/ASSEMBLY 6-10
  A. Fixing Assembly 6-11
  B. Delivery Assembly 6-19

I. OUTLINE OF OPERATION

A. Outline

The upper roller and the lower roller of the fixing assembly and the delivery roller of the delivery assembly are operated by the drive from the main motor (M1) coming through gears.

The upper roller has a built-in heater which is kept on during WMUP after power-on at 1000 W (120 V)/1050 W (230 V). Other than WMUP, the heater is subjected to phase control, and is turned on at 805 W (120/230 V) or off.

The fixing temperature is detected with reference to the surface temperature of the upper roller rear end detected by the main thermistor (TH1) and the sub thermistor (TH2), and is communicated to the microprocessor on the DC controller PCB.

Based on the thermistor signal (TH1, TH2), the DC controller PCB turns on/off the fixing heater drive signal (HEAT_DR) to turn on/off the fixing heater (H1), thereby keeping it at the target temperature. To cut off AC power to the heater in the event of overheating, a thermal switch (TSW1) is mounted at the front of the fixing upper roller.

The copier is designed to remove toner adhering to the upper or the lower roller; for this reason, its heat discharge roller is kept in firm contact with the lower roller.

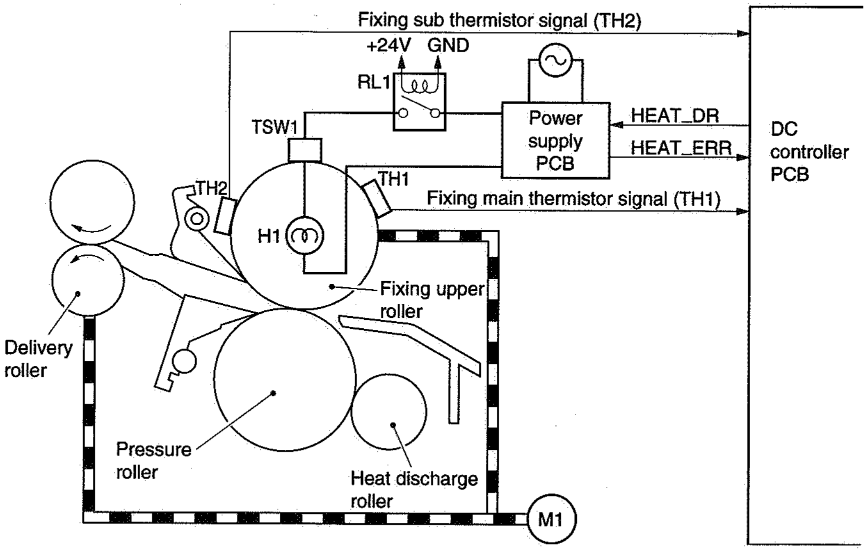

Fixing sub thermistor signal (TH2)
+24V
GND
RL1
TSW1
Power supply PCB
HEAT_DR
HEAT_ERR
DC controller PCB
TH2
TH1
Fixing main thermistor signal (TH1)
H1
Fixing upper roller
Delivery roller
Pressure roller
Heat discharge roller
M1

Figure 6-101

Reference:

Fixing heater:	1000 W for the 120 V model, 1050 W for the 230 V model.
Thermal switch:	230 ±10°C.

B. Controlling the Fixing Temperature

The copier uses two thermistors mounted at the rear ends of the upper roller to monitor surface temperature. When copies are made continuously using sheets of B4 or less, the temperature of the area (center) coming into contact with the paper will be lower than the temperature of the areas (ends) not coming into contact with the paper. To prevent such a problem, the target temperature is varied in steps to suit the width of copy paper and the temperature detected by the thermistor during copying operation.

To improve fixing on rough surface paper or tracing paper, a special paper mode (U13) has been added to user mode, thereby enabling a target temperature unique to these types of paper.

The target temperatures shown in Tables 6-101 - 104 can be changed in service modes "513 - 516".

- Paper Width >257mm (A3, A4, 11"x17", LTR)
  NP7161/NP7160

Temperature detected by thermistor at Start key on	Target temperature immediately after Start key on			Target temperature during continuous copying (upper limit)		
	General plain paper	Paper with rough surface	Tracing paper	General plain paper	Paper with rough surface	Tracing paper
Less than 170˚C	171˚C	196˚C	151˚C	196 ˚C	209˚C	176˚C
170˚C or more, less than 180˚C	183˚C	196˚C	163˚C			
180˚C or more, less than 190˚C	191˚C	196˚C	191˚C			
190˚C or more	196 ˚C	196˚C	176˚C			

Table 6-101a

NP7210

Temperature detected by thermistor at Start key on	Target temperature immediately after Start key on			Target temperature during continuous copying (upper limit)		
	General plain paper	Paper with rough surface	Tracing paper	General plain paper	Paper with rough surface	Tracing paper
Less than 170˚C	171˚C	196˚C	151˚C	196 ˚C	209˚C	176˚C
170˚C or more, less than 180˚C	179˚C	196˚C	159˚C			
180˚C or more, less than 190˚C	187˚C	196˚C	167˚C			
190˚C or more	193˚C	196˚C	173˚C			

Table 6-101b

- 257mm ≧ Paper Width>216mm (B4, B5)
  NP7161/NP7160

Temperature detected by thermistor at Start key on	Target temperature immediately after Start key on			Target temperature during continuous copying (upper limit)		
	General plain paper	Paper with rough surface	Tracing paper	General plain paper	Paper with rough surface	Tracing paper
Less than 170°C	169°C	196°C	144°C	203 °C	211°C	178 °C
170°C or more, less than 180°C	178 °C	196°C	153°C			
180°C or more, less than 190°C	186 °C	196°C	161°C			
190°C or more	196 °C	196°C	171 °C			

Table 6-102a

NP7210

Temperature detected by thermistor at Start key on	Target temperature immediately after Start key on			Target temperature during continuous copying (upper limit)		
	General plain paper	Paper with rough surface	Tracing paper	General plain paper	Paper with rough surface	Tracing paper
Less than 170°C	169°C	196°C	144°C	203 °C	211°C	178 °C
170°C or more, less than 180°C	178 °C	196°C	153°C			
180°C or more, less than 190°C	188 (186)°C	196°C	163 (161)°C			
190°C or more	202 (196)°C	196°C	177 (171) °C			

Figures in brackets refer to pick-up from the multifeeder.

Table 6-102b

- 216 mm ≧ Paper Width > 182 mm (A4R, A5, LGL, LTRR)
  NP7161/NP7160

Temperature detected by thermistor at Start key on	Target temperature immediately after Start key on			Target temperature during continuous copying (upper limit)		
	General plain paper	Paper with rough surface	Tracing paper	General plain paper	Paper with rough surface	Tracing paper
Less than 170°C	177°C	196°C	152°C	215°C	214°C	190°C
170°C or more, less than 180°C	186 (190)°C	196°C	161°C			
180°C or more, less than 190°C	192 (199)°C	196°C	167 °C			
190°C or more	201°C	196°C	176°C			

Table 6-103a

NP7210

Temperature detected by thermistor at Start key on	Target temperature immediately after Start key on			Target temperature during continuous copying (upper limit)		
	General plain paper	Paper with rough surface	Tracing paper	General plain paper	Paper with rough surface	Tracing paper
Less than 170°C	177 (172)°C	196°C	152 (147)°C	215 (210)°C	214°C	190 (185)°C
170°C or more, less than 180°C	190 (181)°C	196°C	165 (156)°C			
180°C or more, less than 190°C	199 (187)°C	196°C	174 (162)°C			
190°C or more, less than 200°C	205 (192)°C	196°C	180 (167)°C			
200°C or more	212 (199)°C	196°C	187 (174)°C			

Figures in brackets refer to pick-up from the multifeeder.

Table 6-103b

- 182 mm ≧ Paper Width (B5R, A5R, STMTR)
  NP7161/NP7160

Temperature detected by thermistor at Start key on	Target temperature immediately after Start key on			Target temperature during continuous copying (upper limit)		
	General plain paper	Paper with rough surface	Tracing paper	General plain paper	Paper with rough surface	Tracing paper
Less than 170°C	175°C	196°C	150°C	215°C	215°C	190°C
170°C or more, less than 180°C	186°C	196°C	161°C			
180°C or more, less than 190°C	194 °C	196°C	169°C			
190°C or more	202°C	196°C	177°C			

Table 6-104a

NP7210

Temperature detected by thermistor at Start key on	Target temperature immediately after Start key on			Target temperature during continuous copying (upper limit)		
	General plain paper	Paper with rough surface	Tracing paper	General plain paper	Paper with rough surface	Tracing paper
Less than 170°C	175 (170)°C	196°C	150 (145)°C	215 (210)°C	215°C	190 (185)°C
170°C or more, less than 180°C	180 (181)°C	196°C	155 (156)°C			
180°C or more, less than 190°C	190 (189)°C	196°C	165 (164)°C			
190°C or more, less than 200°C	205 (193)°C	196°C	180 (168)°C			
200°C or more	210 (201)°C	196°C	185 (176)°C			

Figures in brackets refer to pick-up from the multifeeder.

Table 6-104b

a. Copy Speed Reducing Sequence (*NP7210 only)

To ensure fixing during continuous copying, the NP7210 uses a copy speed reducing sequence for paper less than 216mm wide (less than 257mm when service mode "523" is set on '1').

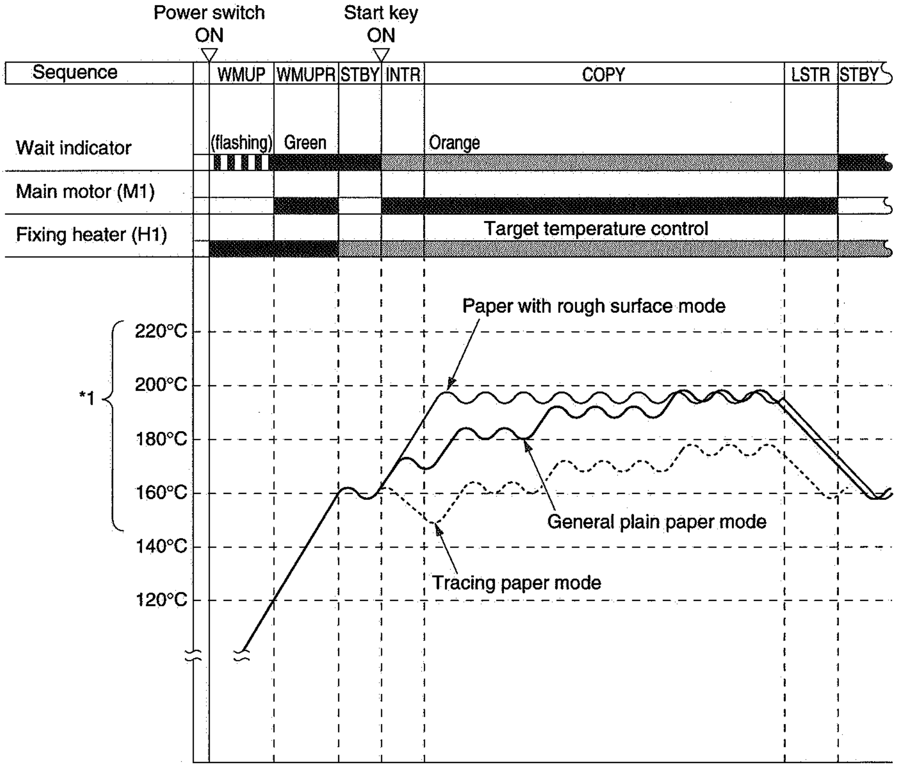
When the DC controller PCB has confirmed that the temperature detected by the thermistor has reached the target temperature immediately after the Start key was turned on, copy count commences.

When the copy count reaches 30, the DC controller PCB increases the interval between copies.

Reference

The number of copies until the target temperature immediately after the Start key is turned on is reached, differs depending on the fixing temperature during standby and the size of the paper. For this reason, the reducing sequence functions after a minimum of 30 copies and a maximum of 40 copies.

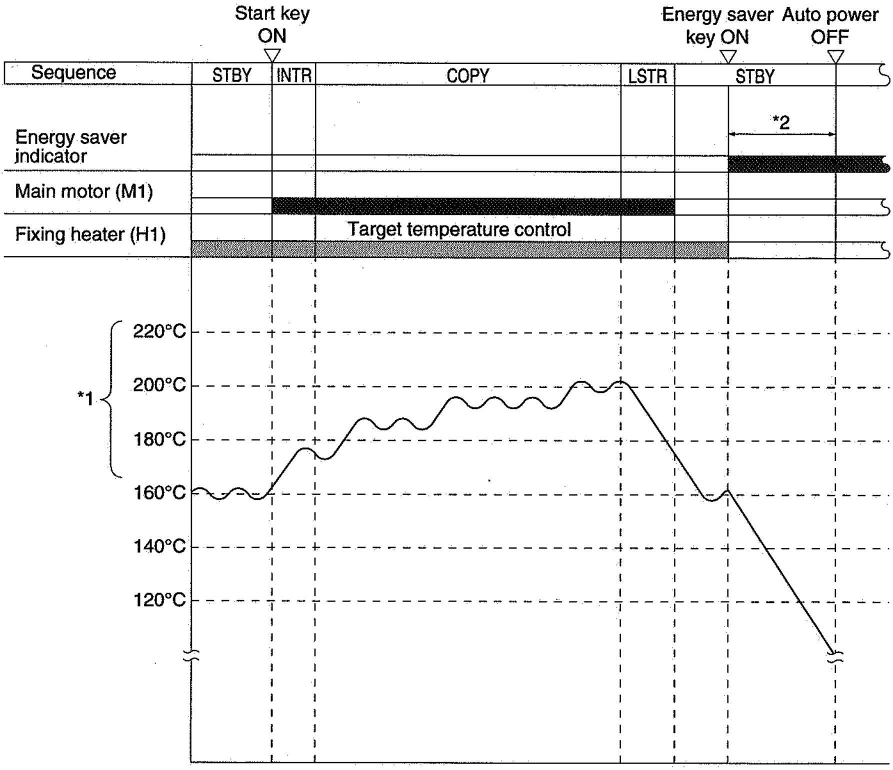
- From Power-On to End of Copying


Power switch ON
Start key ON
Sequence
WMUP
WMUPR
STBY
INTR
COPY
LSTR
STBY
Wait indicator
(flashing)
Green
Orange
Main motor (M1)
Fixing heater (H1)
Target temperature control
220°C
200°C
180°C
160°C
140°C
120°C
*1
Paper with rough surface mode
General plain paper mode
Tracing paper mode

*1:Varies according to paper width.

Figure 6-102

- Power Save Key ON or Auto-Power OFF



*1:Varies according to paper width. *2:May be varied in user mode.

Figure 6-103

C. Error Detection Circuit

1. Outline

The copier's error detection circuit is constructed as shown in Figure 6-104, and monitors the following items for an error:

- Surface temperature of the upper fixing roller
- Activation of the fixing heater (H1)

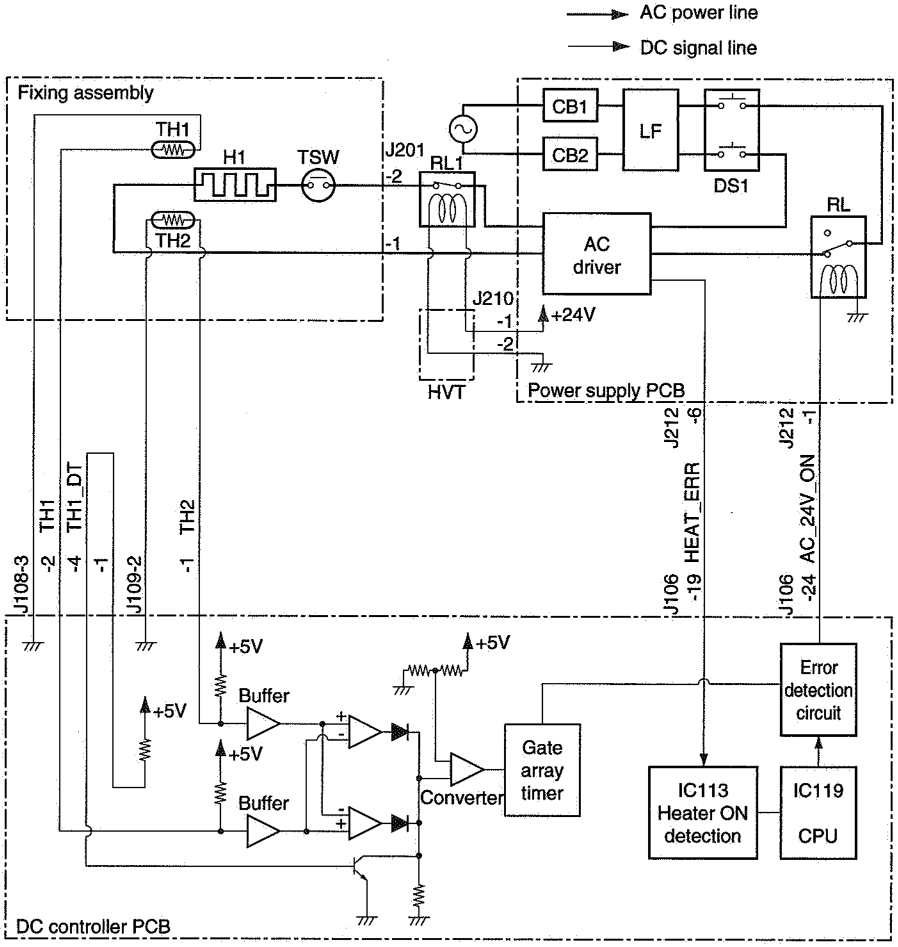

AC power line
DC signal line
Fixing assembly
TH1
H1
TSW
TH2
J201
-2
-1
RL1
J210
-1
-2
HVT
+24V
CB1
CB2
LF
DS1
AC driver
RL
Power supply PCB
J212 -6
J212 -1
J106 -19 HEAT_ERR
J106 -24 AC_24V_ON
J108-3
-2 TH1
-4 TH1_DT
-1
J109-2
-1 TH2
+5V
Buffer
+5V
+5V
Buffer
+5V
+
-
-
+
Converter
Gate array timer
Error detection circuit
IC113 Heater ON detection
IC119 CPU
DC controller PCB

Figure 6-104

2. Surface Temperature of the Fixing Upper Roller

The main thermistor (TH1) and the sub thermistor are arranged nearby at the rear of the fixing upper roller, and are used to monitor the difference in voltage between two thermistor signals (TH1, TH2).

If either thermistor suffers an open circuit, the CW input terminal of the differential amplifier circuit will be about 5 V. At this time, the voltage of the other thermistor will decrease as the surface temperature of the fixing upper roller increases, gradually increasing the output of the differential amplifier circuit.

When the output of the differential amplifier circuit exceeds the value set on the comparator, the comparator will send a signal to the gate array. When the gate array detects the signal from the comparator for a specific period of time, the DC controller PCB will cut off 24 V and AC power supply and, at the same time, will indicate 'E000', 'E002', or 'E003'.

If the connector of the main thermistor is not connected or both thermistors suffer an open circuit, the microprocessor will not be able to detect any excess increases in the surface temperature of the fixing upper roller, causing it to indicate 'E000', 'E002', or 'E003' on the control panel.

3. Activation of the Fixing Heater (H1)

The fixing heater error signal (HEAT_ERR) from the AC drier is monitored by IC113 on the DC controller PCB, and its reading is compared against the fixing heater drive signal (HEAT_DR) to find out whether the power to the fixing heater is normal or not.

If the microprocessor on the DC controller PCB identifies the state of the fixing heater to be faulty, it will cut the power supplied to the fixing heater and, at the same time, will indicate 'E001' on the control panel.

II. DISASSEMBLY/ASSEMBLY

The copier may be disassembled and assembled as shown here. Pay attention to the copier's mechanical characteristics along with the steps for disassembly/assembly.

Important:

1. Turn off the power and disconnect the power plug to ensure safety whenever disassembling/assembling the copier.
2. Unless otherwise noted, assemble the parts by reversing the steps used to disassemble them.
3. Identify the screws by type (length, diameter) to avoid use in the wrong location.
4. Use a washer where needed. The mounting screws used for the grounding wire and varistor come with a washer to ensure electric continuity. Do not forget to use these washers.
5. As a rule, do not operate the copier with any of its parts removed.
6. As screws with a broader pitch than those used in the other covers are used in the rear cover and other parts of the copier, never use screws in parts other than where they originally came from.

A. Fixing Assembly

1. Construction

[1] Upper roller
[2] Lower roller
[3] Heat discharge roller
[4] Delivery roller

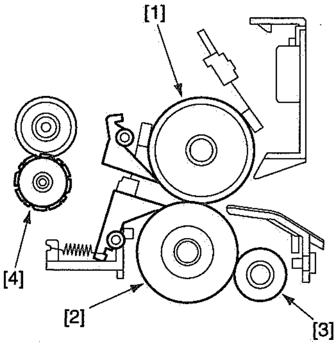


Figure 6-201

2. Locking Mechanism

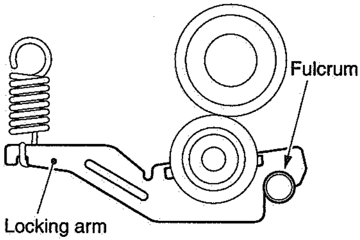


Figure 6-202

3. Removing the Fixing Assembly

1) Remove the rear cover.
2) Disconnect the connector [1].

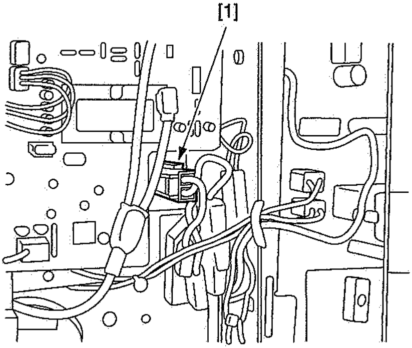


Figure 6-203

3) Remove the drum unit. (See p. 4-28.)
4) Remove the delivery upper cover. (See p. 7-11.)
5) Remove the delivery lower cover. (See p. 7-11.)
6) Disconnect the two connectors [2] (J108, J109) on the DC controller PCB, and free the wires from the harness guide.

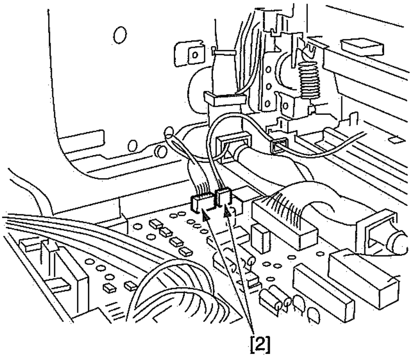


Figure 6-204

7) Remove the front door.
8) Turn the screw [3] counterclockwise, and remove the fixing knob [4].
9) Remove the two mounting screws [5], and remove the fixing front cover [6].

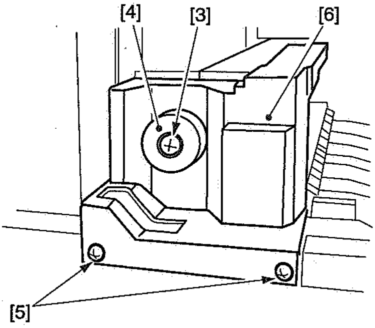


Figure 6-205

10) Disconnect the connector [7], and free the harness from the harness guide.
11) Remove the two mounting screws [8].

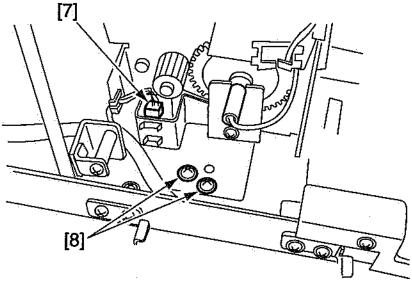


Figure 6-206

12) Lift the front of the fixing assembly [9] slightly to remove.

Caution:
When removing the fixing assembly, take care not to damage the feeding assembly.

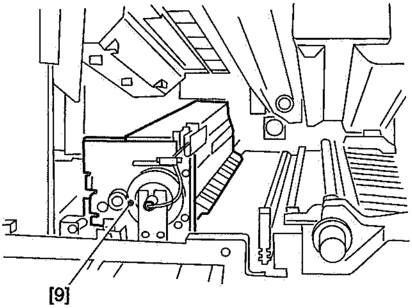


Figure 6-207

4. Removing the Fixing Heater

1) Remove the fixing assembly. (See p. 6-11.)
2) Disconnect the two connectors [1], and free the harness from the harness guide.
3) Remove the mounting screw [2], and detach the heater support plate (front) [3].

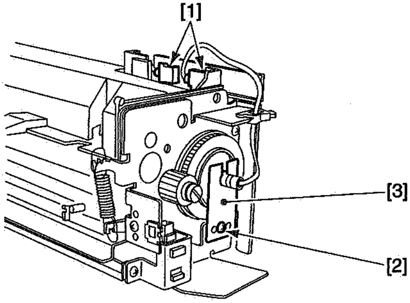


Figure 6-208

4) Remove the mounting screw [4], and free the harness from the harness guide; then, detach the connector support plate [5].
5) Disconnect all connectors [6] from the connector support plate [5].
6) Remove the mounting screw [7], and free the harness; then, detach the harness guide [8].

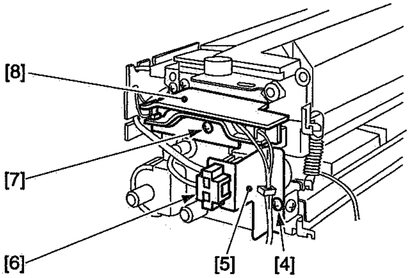


Figure 6-209

7) Free the harness from the harness retainer [9].
8) Remove the two mounting screws [10], and detach the heater support plate (rear) [11].

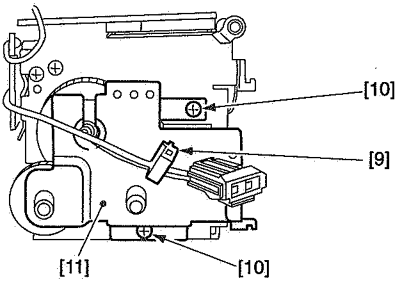


Figure 6-210

9) Free the harness from the harness guide [12], and detach the fixing heater [13].

Caution:
1. Do not start work if the surface of the fixing heater is hot.
2. Do not touch the surface of the fixing heater.
3. If the surface of the fixing heater is soiled, dry wipe it.

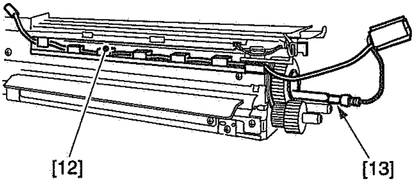


Figure 6-211

5. Removing the Thermal Switch Assembly

1) Remove the fixing assembly. (See p. 6-11.)
2) Disconnect the two connectors [1].

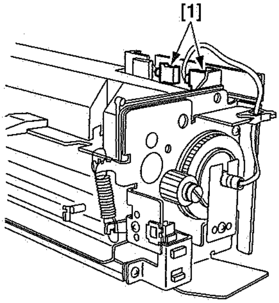


Figure 6-212

3) Remove the mounting screw [2], and detach the thermal switch assembly [3].

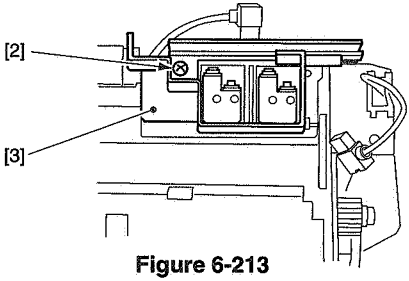


Figure 6-213

6. Removing the Main Thermistor

1) Remove the fixing assembly. (See p. 6-11.)
2) Remove the mounting screw [1], and free the harness from the harness guide; then, detach the main thermistor [2].

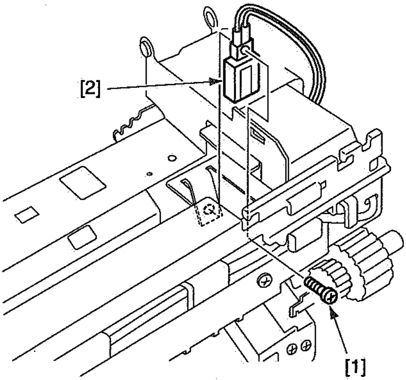


Figure 6-214

7. Removing the Sub Thermistor

1) Remove the fixing assembly. (See p. 6-11.)
2) Open the upper delivery assembly, and insert a screwdriver into the hole [A] to keep the upper delivery assembly from closing.

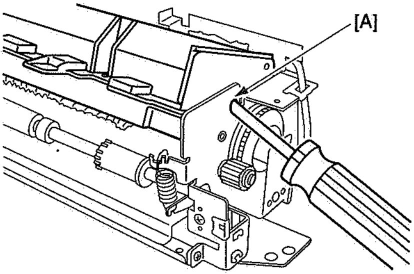


Figure 6-215

3) As shown, pick the hook assembly with pincers, and remove the tension spring [1].

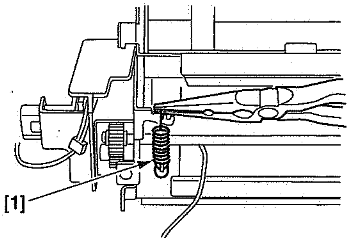


Figure 6-216

4) Remove the mounting screw [2].
5) Free the harness from the harness guide, and remove the sub thermistor [3].

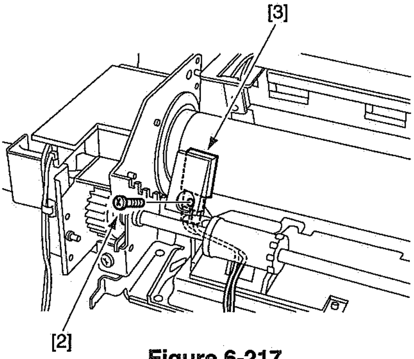


Figure 6-217

8. Removing the Fixing Upper Roller

1) Remove the fixing heater. (See p. 6-13.)
2) Remove the upper delivery assembly. (See p. 6-19.)
3) Remove the delivery roller assembly (See p. 6-20.)
4) Remove the three mounting screws [1], and remove the fixing upper inlet guide assembly [2].

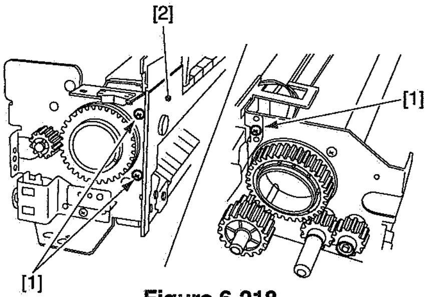


Figure 6-218

5) Remove the double gear [3] and the C-ring [4]; then, detach the gear [5] and the bushing [6].

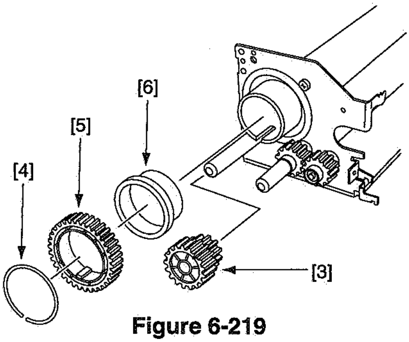


Figure 6-219

6) Remove the C-ring [7], and detach the gear [8] and the bushing [9].
7) Remove the fixing upper roller [10].

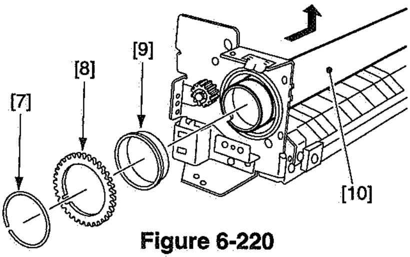


Figure 6-220

9. Removing the Fixing Lower Roller

1) Remove the fixing upper roller. (See p. 6-16.)
2) Remove the bearing [1] and the fixing lower roller [2].

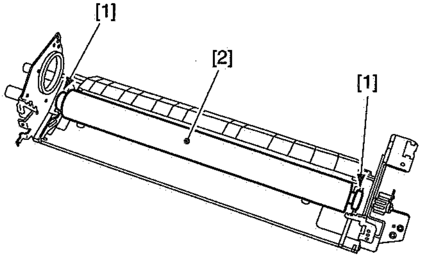


Figure 6-221

10. Removing the Heat Discharge Roller

1) Remove the fixing assembly. (See p. 6-11.)
2) Remove the two mounting screws [1], and detach the fixing inlet guide assembly [2].

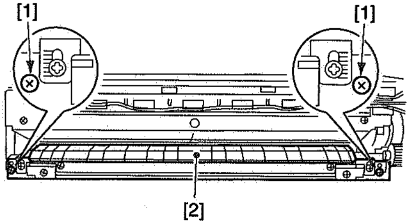


Figure 6-222

3) Remove the heat discharge roller [3].

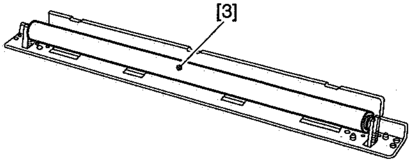


Figure 6-223

Caution:

If you have removed the height adjusting screw of the inlet guide, be sure to perform the steps under "Adjusting the Height of the Fixing Inlet Guide."

11. Adjusting the Height of the Fixing Inlet Guide

Loosen the two adjusting screws [1], and adjust the height of the fixing inlet guide [2].

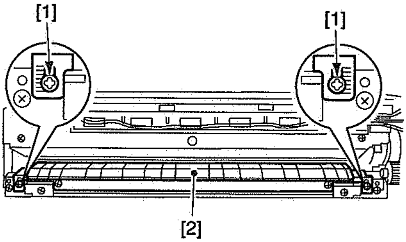


Figure 6-224

12. Adjusting the Nip

The nip is appropriate if it is as indicated in Table 6-201.

If it is not as indicated, relocate the tension spring [1].

Note:
a and c are points 10 mm from both ends of copy paper.

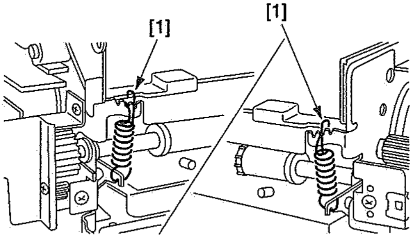


Figure 6-225

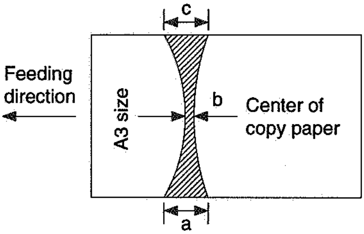


Figure 6-226

Dimensions	Measurements*
b	4.8 ± 0.3mm
I a - c I	0.5mm or less

*Be sure both upper and lower rollers are sufficiently warm before taking measurements.

Table 6-201

a. Measuring the Nip

When the copier finishes warm-up, wait for 15 minutes. Then, make 20 A4 copies before measuring the nip.

1) Open the copyboard cover, and make a solid black copy on A3 copy paper.
2) Place the copy paper made at step 1) in the multifeeder, and select the multifeeder as the source of paper.
3) Execute service mode 406 (fixing nip check).
   - The copy paper will be stopped when its leading edge is about 100 mm, and will automatically be discharged (See Figure 6-226).

B. Delivery Assembly

1. Removing the Upper Separation Claw

1) Remove the fixing assembly. (See p. 6-11.)
2) Remove the stepped screw [1], and detach the bend [A]); then, detach the upper delivery assembly [2].

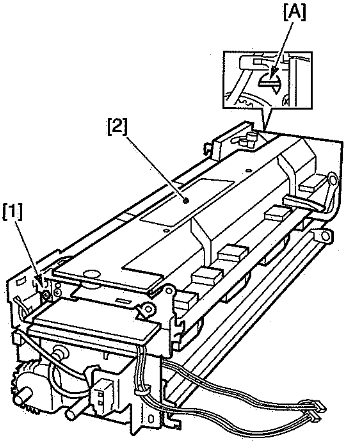


Figure 6-227

3) Remove the two stepped screws [3], and slide the upper separation claw assembly [4] in the direction of the arrow to remove.

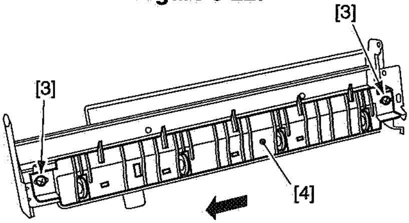


Figure 6-228

4) Detach the spring [5], and detach the upper separation claw [6].

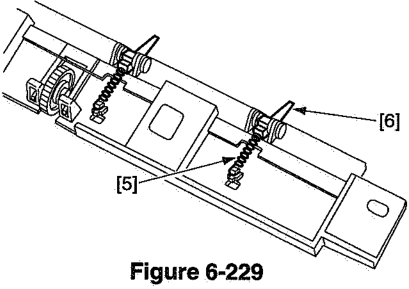


Figure 6-229

2. Removing the Lower Separation Claw

1) Remove the delivery roller. (See p. 6-20.)
2) Remove the two stepped screws [1], and free the harness; then, detach the lower separation claw assembly [2].

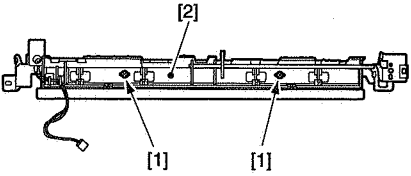


Figure 6-230

3) Detach the spring [3], and detach the lower separation claw [4].

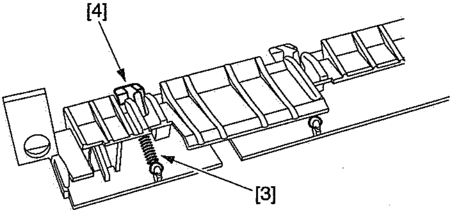


Figure 6-231

3. Removing the Delivery Roller

1) Remove the two tension springs [1] and the two mounting screws [2]; then, remove the delivery roller assembly [3].

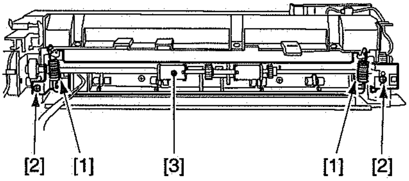


Figure 6-232

2) Remove the grip ring [4], and remove the gear [5].

3) Remove the two E-rings [6] and the two bushings [7]; then, detach the delivery roller [8].

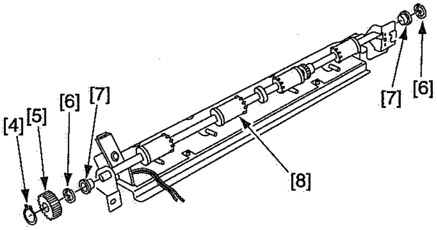


Figure 6-233

CHAPTER 7

EXTERNALS/AUXILIARY MECHANISMS

This chapter shows the copier's external parts, and explains the principles used for the copier's various control mechanisms in view of the functions of electrical and mechanical units and in relation to their timing of operation. It also shows how these units may be disassembled/assembled and adjusted.

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  J. Lamp Regulator PCB 7-21

I. FANS

The copier is equipped with three fans for cooling and discharging ozone.

When a sorter is installed, the vent for the exhaust fan (FM2, FM4) is blocked, preventing discharge of ozone to the left of the copier. To enable discharge, use a sorter kit fan (FM5) to the front of the copier to route the ozone from the exhaust fan (FM2, FM4) to the front.

Table 7-101 shows the function of each fan and the orientation of the fan. Figure 7-102 shows the timing at which each fan turns on.

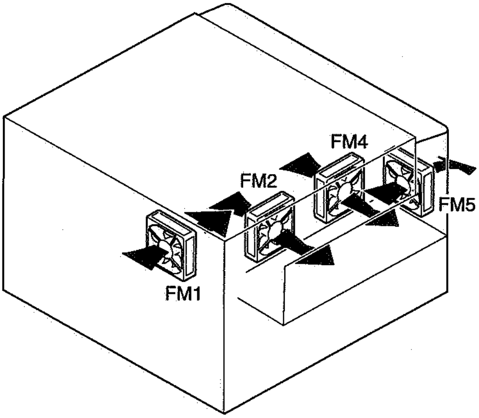


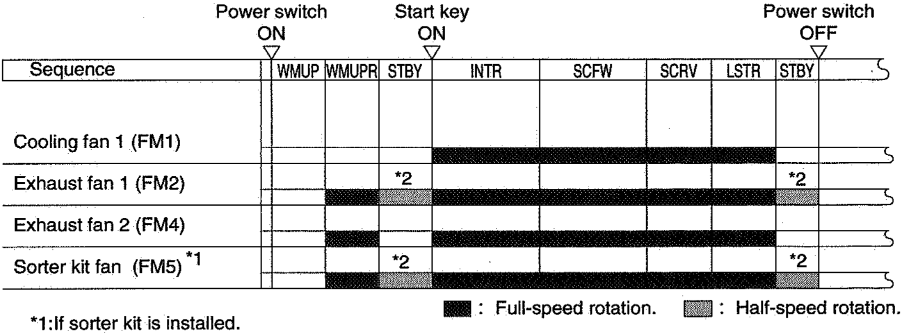
Figure 7-101

Notation	Name	Orientation	Filter	Function
FM1	Cooling fan 1	Blowing	Air	Cools the scanner.
FM2	Exhaust fan 1	Drawing	Ozone	Discharges exhaust.
FM4	Exhaust fan 2	Drawing	Ozone	
FM5 *1	Sorter kit fan	Drawing	Air	

*1:If a sorter kit is installed.

Table 7-101

To prevent the temperature inside the machine rising, the exhaust fan (FM2) and sorter kit fan (FM5) rotate repeatedly at half speed for 11 minutes and at full speed for 1 minute during standby. If the reading of the cleaner thermistor (TH3) is 50°C or more (38°C or more if the sorter kit is installed), all fans will be rotated at full speed.



*1:If sorter kit is installed.

*2:Repeated half-speed rotation for 11min. and full-speed rotation for 1min.

Figure 7-102

The speed of the exhaust fans is switched between full speed and half speed by switching the drive voltage of the exhaust fans as shown in Figure 7-103.

When the CPU generates FMON=1, +24 V is supplied so that the exhaust fans (FM2, FM4, FM5) rotate at full speed. In response to FMHLF=1, on the other hand, +15.4 V will be supplied so that the exhaust fans (FM2, FM5) rotate at half speed.

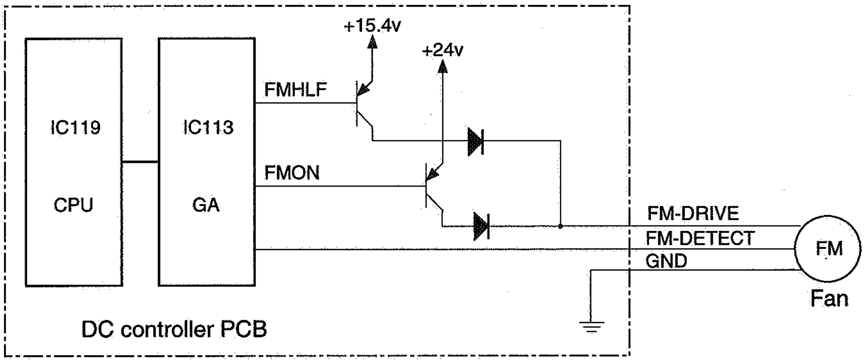


Figure 7-103

If the heat exhaust fan rotation detection signal (FM2ROT) is not detected 0.5 sec after the exhaust fan (FM2, FM4) starts to rotate, error code E805 will be indicated on the control panel.

In the case of models NP7161 and NP7160, the cooling fan (FM1) rotates at full speed at 24V during copying. In the case of the NP7210, for greater quietness, it rotates at 19V and at reduced speed. (However, when the NP7210 sorter kit is installed, it runs at full speed at 24V.)

II. POWER SUPPLY

A. Outline of Power Supply

Figure 7-201 is a block diagram showing distribution of power inside the machine.

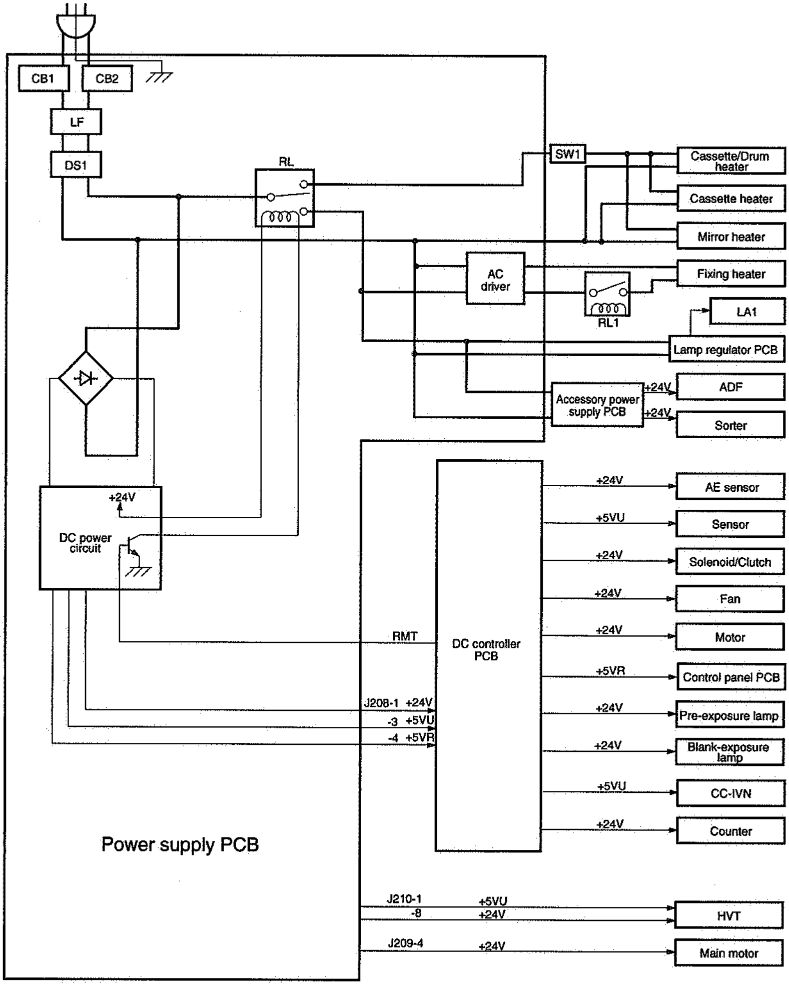

CB1
CB2
LF
DS1
RL
SW1
Cassette/Drum heater
Cassette heater
Mirror heater
AC driver
Fixing heater
RL1
LA1
Lamp regulator PCB
Accessory power supply PCB
+24V
ADF
+24V
Sorter
+24V
DC power circuit
+24V
AE sensor
+5VU
Sensor
+24V
Solenoid/Clutch
+24V
Fan
RMT
DC controller PCB
+24V
Motor
+5VR
Control panel PCB
J208-1 +24V
-3 +5VU
-4 +5VR
+24V
Pre-exposure lamp
+24V
Blank-exposure lamp
+5VU
CC-IVN
+24V
Counter
Power supply PCB
J210-1
-8
+5VU
+24V
HVT
J209-4
+24V
Main motor

Figure 7-201

B. Power Supply Circuitry

1. AC Power Supply

AC power is supplied to the power supply PCB when the power plug is connected and the front door switch (DS1) is turned on.

2. DC Power Supply

The power supply PCB provides three types of DC outputs: +24 V, +5 VR, and +5 VU.

When the power plug is connected and the front door switch (DS1) is turned on, the power supply PCB supplies the DC controller PCB with +5 VR.

The copier uses a soft switch as its power switch so that it continues to supply the DC controller PCB with +5 VR even when the power switch is off.

When the power switch is turned on, the CPU generates the DC power supply signal.

In response to the DC power supply signal, the power supply PCB generates +24 V and +5VU. This condition turns on the AC power supply relay (RL) on the power supply PCB, thereby making a switch-over to the fixing heater and the lamp regulator PCB.

When the power switch is turned off, the AC power supply relay (RL) on the power supply PCB switches over to the options heater.

Reference:

The tolerance of DC voltage is as follows:

• +24 V	±5%
• +5 VU	+5%, -7%
• +5 VR	±5%

However, the above applies only when the inaccuracy of the AC input is limited to ±10%.

Caution:

Be sure to disconnect the power plug whenever you have to replace the DC controller PCB.

3. Cassette/Drum Heater, Mirror Heater, and Cassette Heater

The following three heaters are made available as accessories to the copier, designed to prevent condensation of the scanner and the drum and to keep paper inside the cassette dry.

Table 7-201 shows the function of each heater. Figure 7-202 shows the timing at which each heater turns on.

Notation	Name	Function
H2	Cassette/Drum heater	Prevents condensation on the drum and keeps copy paper dry.
H3	Mirror heater	Prevents condensation on the scanner.
H4	Cassette heater	Keeps copy paper dry.

Table 7-201

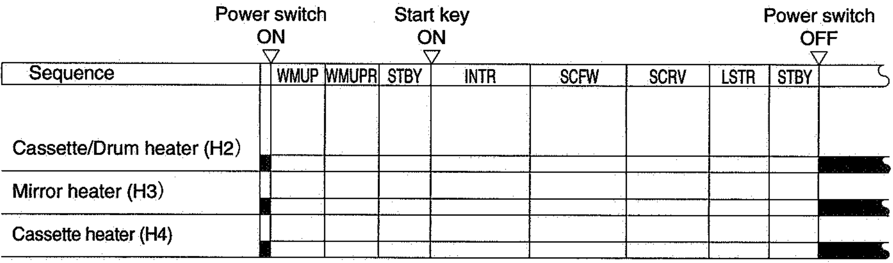


Figure 7-202

Each heater is supplied with power when the copier's power switch is turned off. The cassette/drum heater, the mirror heater and the cassette heater may be deprived of power by turning off the heater switch (SW1).

4. ADF and Sorter

For the ADF and the sorter, the copier's power supply PCB supplies AC power to the accessory power supply PCB, which generates DC power.

C. Protection Mechanisms of the Power Supply Circuitry

The copier's power supply PCB is equipped with a circuit breaker (CB1, CB2) and a fuse (FU1, FU2) on its AC input side. To protect against overcurrent and over voltage, the copier is also equipped with an overcurrent protection circuit and an over-voltage protection circuit.

When an overcurrent or an over-voltage occurs as a result of a short circuit in the power line, the respective protection mechanism will turn on to stop the output of the power supply PCB.

When the output is stopped, disconnect the copier's power plug, and turn off the AC power to the power supply PCB to reset the protection mechanism.

Caution:
Be sure to correct the cause that turned on the protection circuit before resetting. Repeated short-circuiting and resetting can cause the fuse built into the power supply PCB to melt.

III. DISASSEMBLY/ASSEMBLY

The copier may be disassembled and assembled as shown here. Pay attention to the copier's mechanical characteristics along with the steps for disassembly/assembly.

Important:

1. Turn off the power and disconnect the power plug to ensure safety whenever disassembling/assembling the copier.
2. Unless otherwise noted, assemble the parts by reversing the steps used to disassemble them.
3. Identify the screws by type (length, diameter) to avoid use in the wrong location.
4. Use a washer where needed. The mounting screws used for the grounding wire and varistor come with a washer to ensure electric continuity. Do not forget to use these washers.
5. As a rule, do not operate the copier with any of its parts removed.
6. As screws with a broader pitch than those used in the other covers are used in the rear cover and other parts of the copier, never use screws in parts other than where they originally came from.

A. External Covers

[1] Front cover
[2] Right door (5)
[3] Upper right cover (2)
[4] Right cover (2)
[5] Rear cover (5)
[6] Upper rear cover (4)
[7] Upper left cover (2)
[8] Delivery lower cover (2)
[9] Delivery upper cover (2)

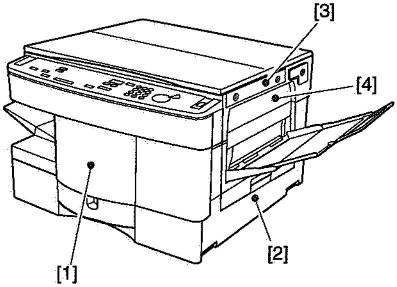


Figure 7-301

The number in parentheses indicates the number of mounting screws used.

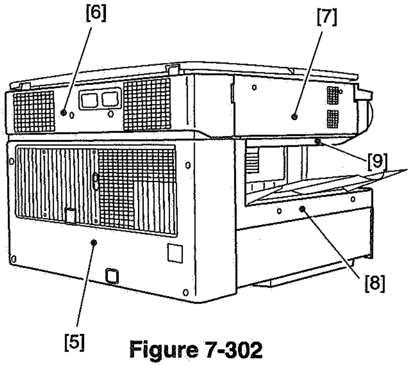


Figure 7-302

[1] Inside cover (2)
[2] Lower inside cover (3)

The number in parentheses indicates the number of mounting screws used.

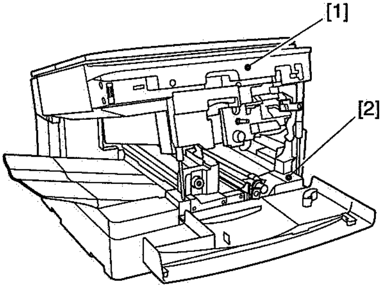


Figure 7-303

Remove the appropriate covers as follows when cleaning, checking, or repairing the inside of the copier.

Covers which may be detached by mere removal of mounting screws are omitted from the discussions.

1. Removing the Right Door

1) Open the right door.
2) Remove the four mounting screws [1], and remove the right door [2] and the paper guide [3].

Caution:
When mounting the paper guide, be sure to fit the foot of the spring [4] at the rear into its hole.

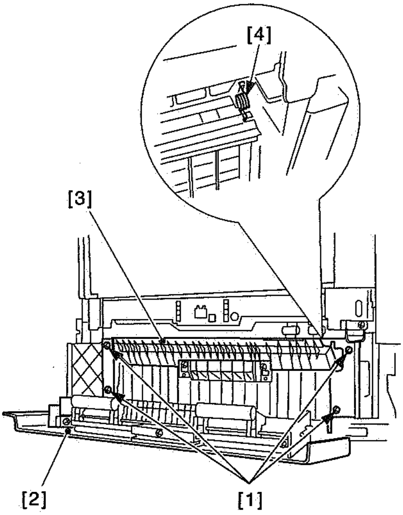


Figure 7-304

2. Removing the Upper Right Cover

1) Open the top unit.
2) Remove the two mounting screws [1], and remove the right cover [2].
3) Remove the two mounting screws [3], and remove the upper right cover [4].

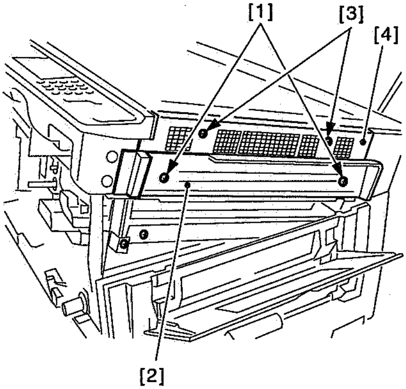


Figure 7-305

3. Removing the Upper Left Cover

1) Remove the copyboard glass.
2) Remove the two mounting screws [1], and detach the upper left cover [2].

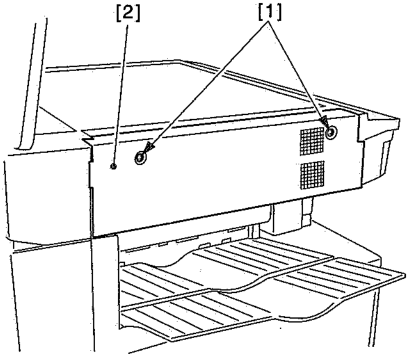


Figure 7-306

4. Removing the Delivery Lower Cover

1) Open the copier top, and remove the copy tray.
2) Remove the two mounting screws [1], and detach the delivery lower cover [2].

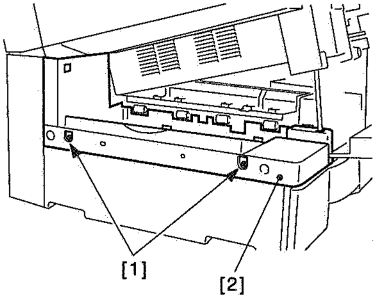


Figure 7-307

5. Removing the Delivery Upper Cover

1) Open the copier top, and remove the inside cover.
2) Remove the two mounting screws [1], and slide the delivery upper cover [2] to the front to remove.

Caution:
When mounting the delivery upper cover, be sure to engage the two cut-offs in the delivery upper cover with the copier's hooks.

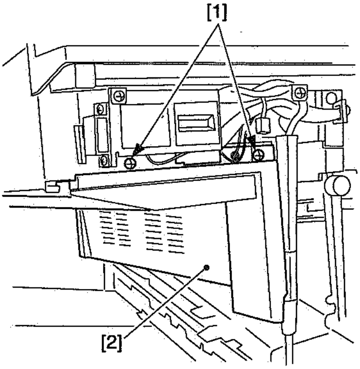


Figure 7-308

6. Removing the Lower Inside Cover

1) Remove the front door and the transfer charging assembly.
2) Slide out the registration knob [1] to the front.
3) Remove the mounting screw [2].
4) Loosen the two mounting screws [3], and remove the lower inside cover [4].

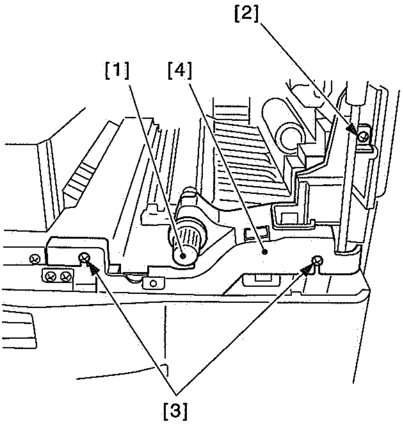


Figure 7-309

B. Control Panel

1. Removing the Control Panel

1) Open the copyboard cover, and remove the two mounting screws [1]; then, detach the two ADF metal catches [2].
2) Remove the inside cover.

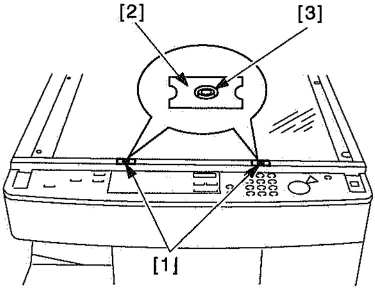


Figure 7-310

3) Remove the three mounting screws [3].
4) Slide the control panel [4] to the front to remove; then, turn over the control panel.

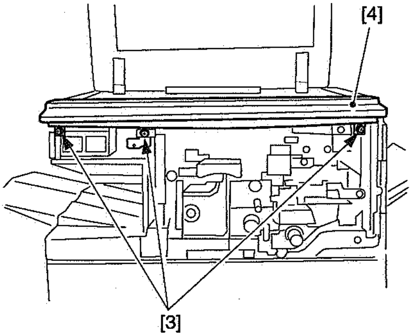


Figure 7-311

5) Disconnect the three connectors [5], and remove the control panel.

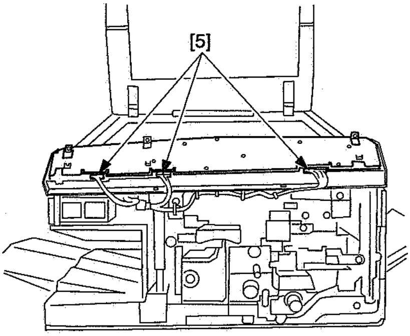


Figure 7-312

C. Copyboard Glass

1. Removing the Copyboard Glass

1) Remove the two mounting screws [1], and detach the glass retainer (right) [2].

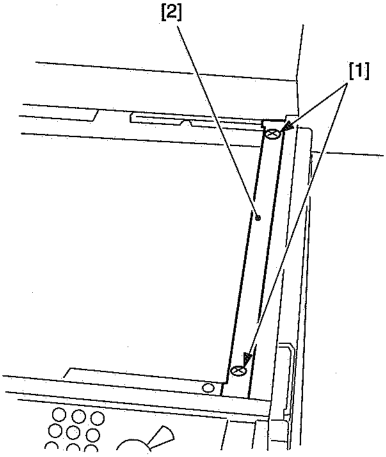


Figure 7-313

2) Slide the copyboard glass [3] to the right.
3) Remove the two mounting screws [4], and detach the glass retainer (left) [5].
4) Remove the copyboard glass [3].

Caution:
When mounting the NP7161/NP7210's copyboard glass, make sure that the blue marking on the side of the glass is to the front left.

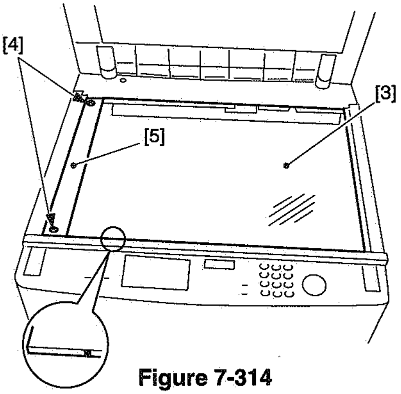


Figure 7-314

D. Fans

1. Removing the Scanner Cooling Fan

1) Remove the two mounting screws [1], and detach the filter [2].

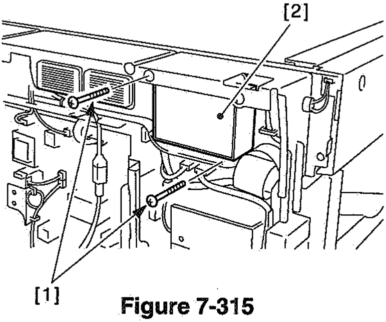


Figure 7-315

2) Disconnect the connector [3], and remove the scanner cooling fan [4].

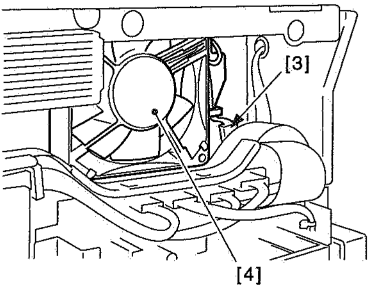


Figure 7-316

2. Removing the Exhaust Fan

1) Remove the developing assembly, drum unit, inside cover, and delivery upper cover.
2) Disconnect the two connectors [1].

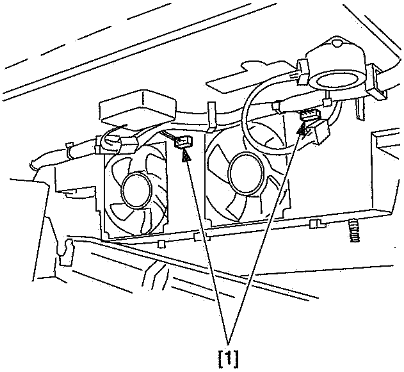


Figure 7-317

3) Remove the two mounting screws [2], and slide the exhaust fan assembly [3] to the front to remove.

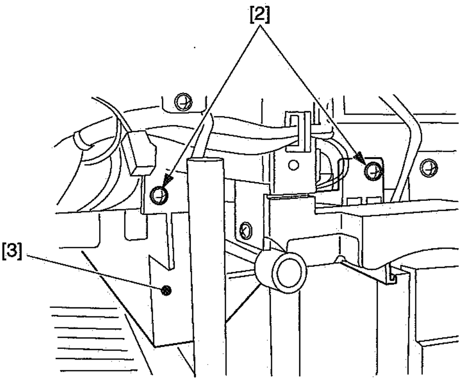


Figure 7-318

4) Disconnect the two connectors [4], and remove the two exhaust fans [5].

Caution:
When mounting the exhaust fan assembly, be sure to engage the two hooks on the exhaust fan assembly with the copier's cut-offs.

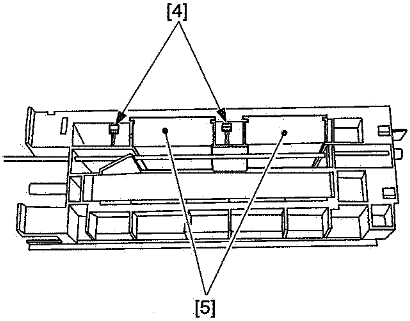


Figure 7-319

3. Remove the Ozone Filter

1) Open the top unit.
2) Shift down the lever [1], and remove the ozone filter assembly [2].

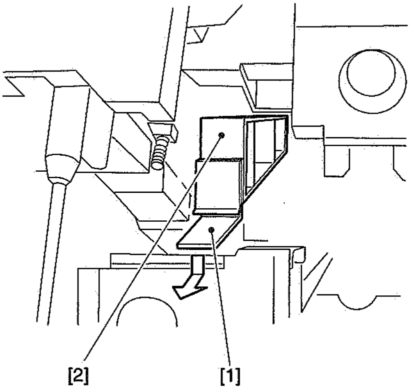


Figure 7-320

3) Remove the ozone filter [3].

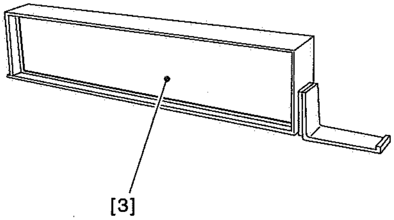


Figure 7-321

E. Counter Assembly

1. Removing the Counter Assembly

1) Remove the control panel.
2) Disconnect the two connectors [1], and remove the two mounting screws [2]; then, detach the counter assembly [3].

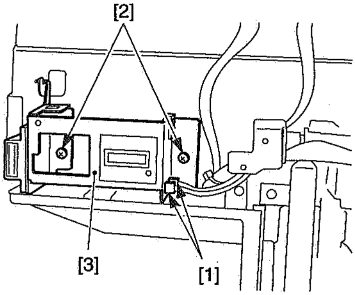


Figure 7-322

F. Main Motor Assembly

1. Removing the Main Motor Assembly

1) Remove the rear cover and the rear upper cover.
2) Disconnect the connector [1], and remove the four mounting screws [2].
3) Remove the two locking supports [3], and detach the main motor assembly [4].

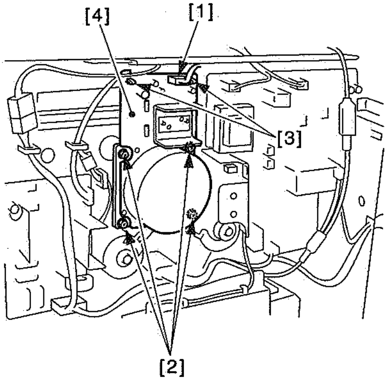


Figure 7-323

G. DC Controller PCB

1. Removing the DC Controller PCB

1) Remove the delivery lower cover.
2) Disconnect all connectors of the DC controller PCB; then, free the harness from the harness guide.
3) Remove the six mounting screws [1], and remove the DC controller PCB [2] together with the base plate.

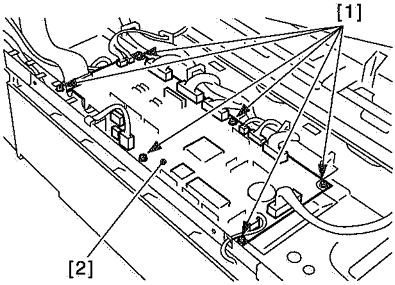


Figure 7-324

> **Caution:**
> Take extra care not to damage the harness whenever you are removing the DC controller PCB.

The DC controller PCB is equipped with a built-in battery (BAT101). Keep the following in mind to prevent its both ends from short circuiting and heating:

2. Points to Note When Replacing the DC Controller PCB

- When sending the DC controller to the workshop or the factory, put it in a conducting bag intact with its base plate.
  Use a conducting bag whose one side is transparent, and be sure that the face of the DC controller PCB shows through the transparent side.
- After replacement, make adjustments and settings in service mode and make settings in user mode once again.
- For settings in service mode, enter the values recorded in the Service Label stored behind the front door.

H. Removing the Power Supply PCB

1. Removing the Power Supply PCB

1) Remove the rear cover.
2) Remove the fixing heater connector [1].
3) Remove the two fastons [2] on the relay.
4) Remove all the connectors on the power supply PCB.
5) Remove the AC harness [3] from the harness guide.
6) Cut the tie-wrap [4].
When attaching the tie-wrap, attach it in the original position.
7) Remove the four screws [5], then remove the power supply PCB [6].

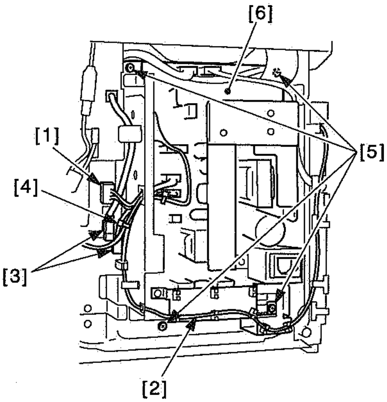


Figure 7-325

I. Removing the High-Voltage Power Supply PCB

1. Removing the High-Voltage Power Supply PCB

1) Remove the rear cover and upper rear cover.
2) Remove all the connectors on the high-voltage power supply PCB, then remove the faston [1] and high-voltage harness [2].
3) Remove one screw [3] and four locking supports [4], then remove the high-voltage power supply PCB [5].

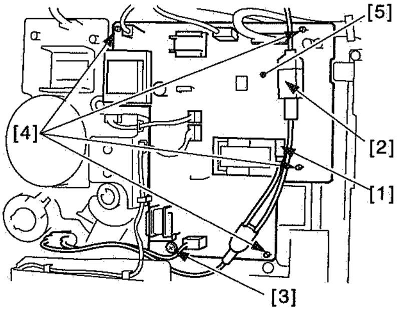


Figure 7-326

J. Lamp Regulator PCB

1. Removing the Lamp Regulator PCB

1) Remove the rear cover.
2) Remove the two connectors [1] on the lamp regulator PCB.
3) Remove one four locking supports [2], then remove the lamp regulator PCB [3].

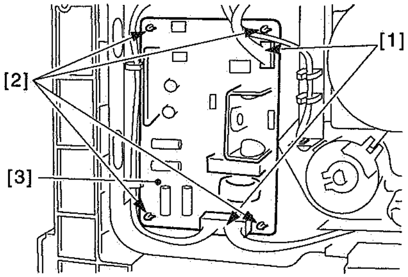


Figure 7-327

CHAPTER 8

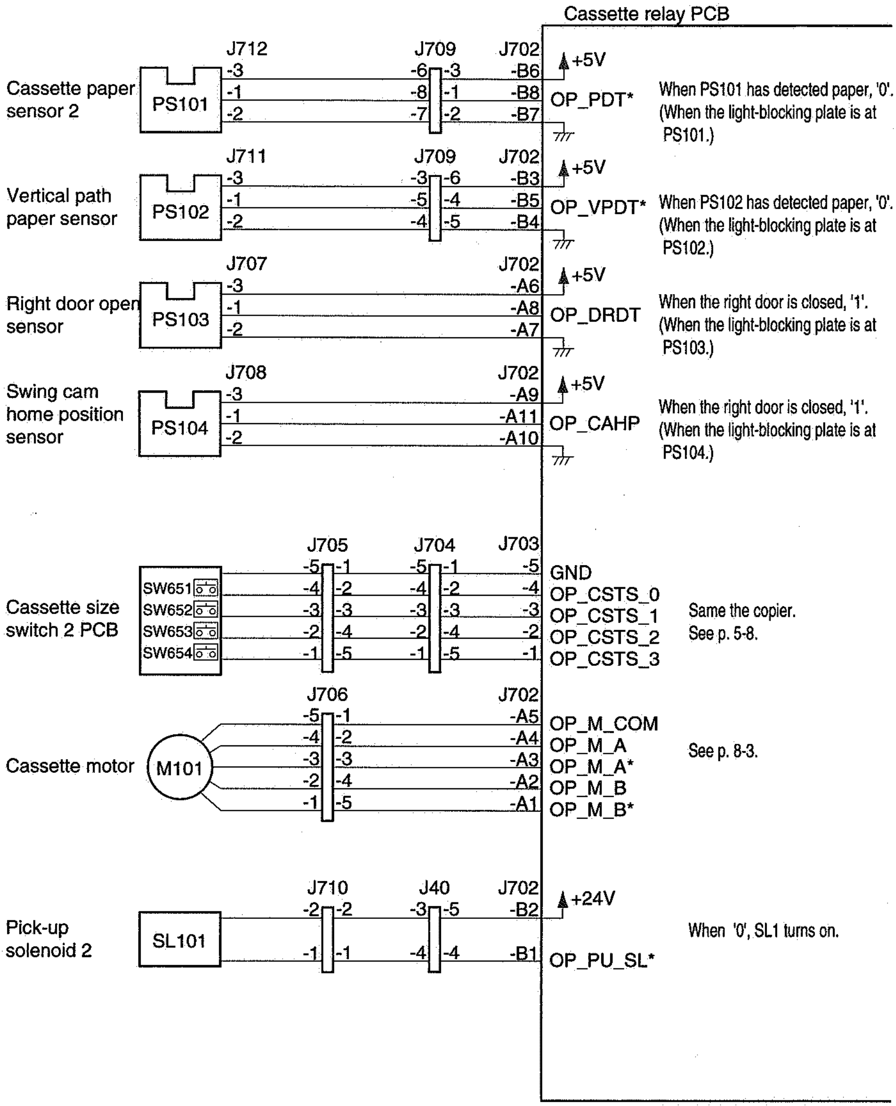
CASSETTE FEEDING MODULE

This chapter explains the basic operation, purpose and role of the cassette feeding module, the rela ship between the electrical and mechanical systems, and the timing of operation of each part.

I. CASSETTE FEEDING MODULE............8-1
  A. Inputs to and Outputs from Cassette relay PCB..8-1
  B. Cassette Feeding..............................8-2
  C. Waste Toner Swing Control..............8-7
II. JAM DETECTION..................................8-8
  A. Outline...8-8
  B. Jam Detection Sequence...................
III. DISASSEMBLY & ASSEMBLY...............
  A. External Cover..................................
  B. Drive Assembly.................................
  C. Pick-Up Assembly..............................
  D. Cassette Size Switch Assembly.........
  E. Cassette Relay PCB..........................

I. CASSETTE FEEDING MODULE

A. Inputs to and Outputs from Cassette relay PCB


Cassette relay PCB
Cassette paper sensor 2
PS101
J712
J709
J702
-3
-1
-2
-6
-8
-7
-B6
-B8
-B7
+5V
OP_PDT*
Vertical path paper sensor
PS102
J711
J709
J702
-B3
-B5
-B4
+5V
OP_VPDT*
Right door open sensor
PS103
J707
J702
-A6
-A8
-A7
+5V
OP_DRDT
Swing cam home position sensor
PS104
J708
J702
-A9
-A11
-A10
+5V
OP_CAHP
Cassette size switch 2 PCB
SW651
SW652
SW653
SW654
J705
J704
J703
GND
OP_CSTS_0
OP_CSTS_1
OP_CSTS_2
OP_CSTS_3
Cassette motor
M101
J706
J702
-A5
-A4
-A3
-A2
-A1
OP_M_COM
OP_M_A
OP_M_A*
OP_M_B
OP_M_B*
Pick-up solenoid 2
SL101
J710
J40
J702
-B2
-B1
+24V
OP_PU_SL*

When PS101 has detected paper, '0'. (When the light-blocking plate is at PS101.)

When PS102 has detected paper, '0'. (When the light-blocking plate is at PS102.)

When the right door is closed, '1'. (When the light-blocking plate is at PS103.)

When the right door is closed, '1'. (When the light-blocking plate is at PS104.)

Same the copier. See p. 5-8.

See p. 8-3.

When '0', SL1 turns on.

Figure 8-101

B. Cassette Feeding

1. Outline

The cassette feeding module feeds the copy paper in accordance with the control signals from the DC controller PCB in the copier.

Pick-up and feeding of the paper are carried out by operation of the cassette motor (M101).

2. Pick-Up Operation

The pick-up roller is controlled by the cassette motor (M101) and pick-up solenoid (SL101).

The paper inside the cassette is lifted up by the lifter. The cassette pick-up roller is controlled by the pick-up solenoid and is separated from the surface of the paper.

When the pick-up solenoid is activated, the claw is disengaged from the pick-up gear and the driving force of the cassette motor (M101) is transmitted to the cassette pick-up roller.

One sheet of paper is sent to the feed roller by the motion of the cassette pick-up roller and the separation claw. In the event that more than one sheet of paper is sent, the feed roller and separation roller ensure that only one sheet goes to the extraction roller.

The paper is then fed into the copier by the extraction roller.

Cassette lifter operation and cassette size detection are the same as for the copier itself. (See p.5-4)

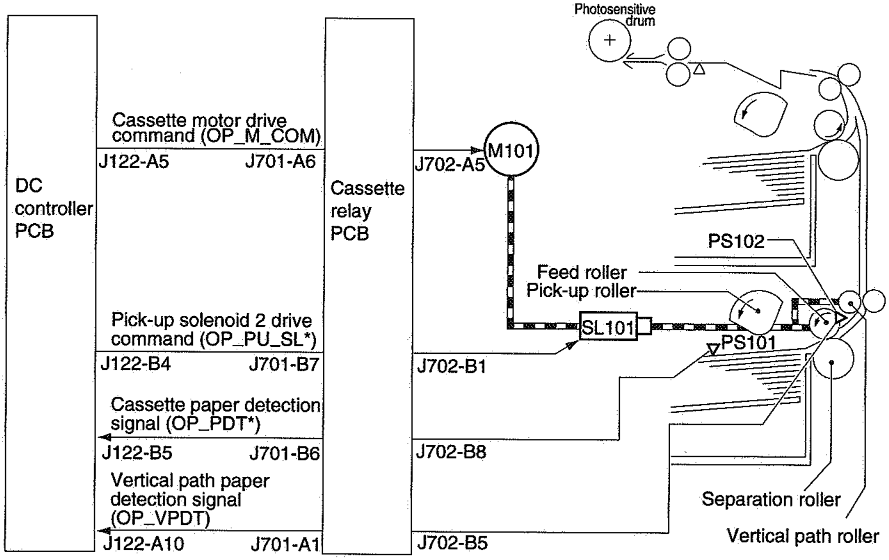

DC controller PCB
Cassette relay PCB
Cassette motor drive command (OP_M_COM)
J122-A5
J701-A6
J702-A5
M101
Pick-up solenoid 2 drive command (OP_PU_SL*)
J122-B4
J701-B7
J702-B1
Cassette paper detection signal (OP_PDT*)
J122-B5
J701-B6
J702-B8
Vertical path paper detection signal (OP_VPDT)
J122-A10
J701-A1
J702-B5
Photosensitive drum
PS102
Feed roller
Pick-up roller
SL101
PS101
Separation roller
Vertical path roller

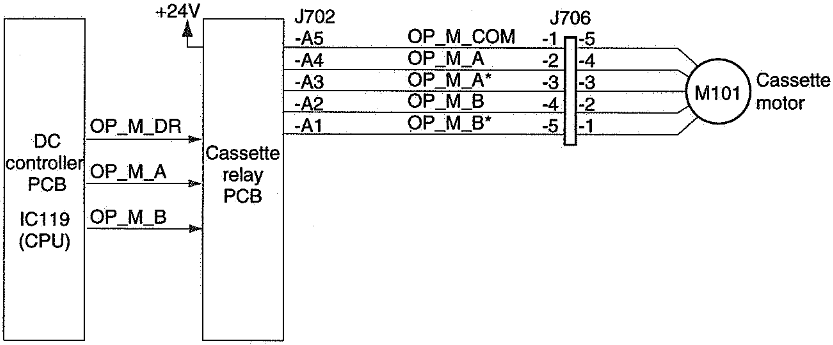
Figure 8-102

3. Cassette Motor Control Circuit

The cassette motor (M101) is a 4-phase stepping motor.

The cassette motor is controlled by the two pulse signals from the DC controller PCB (OP_M_A and OP_M_B) output as 4 pulse signals on the cassette PCB (OP_M_A, OP__M_B, OP_M_A* AND OP_M_B*).

Turning the cassette motor on and off and the rotating direction are controlled by changing the output timing of the 4 pulse signals, and the rotating speed is controlled by selecting the clock pulse sent to the cassette motor.

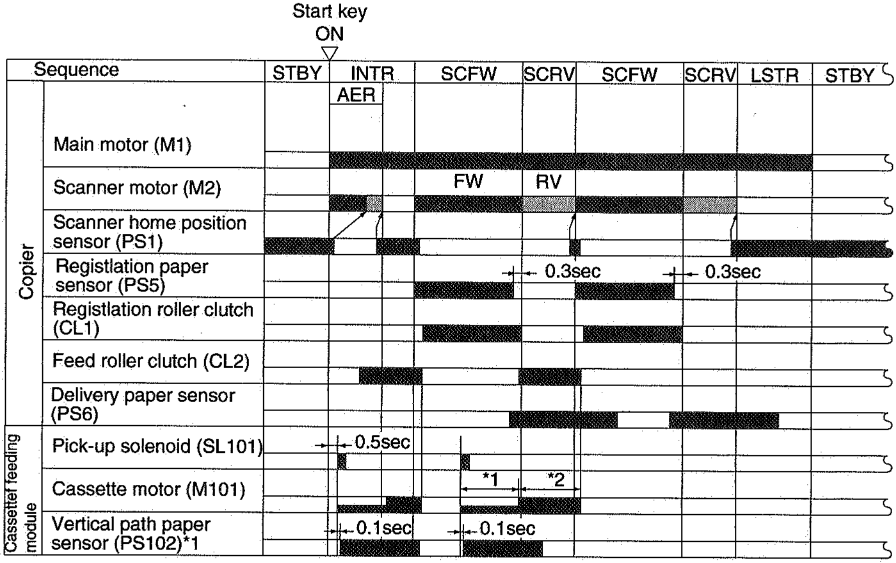


+24V
DC controller PCB
IC119 (CPU)
OP_M_DR
OP_M_A
OP_M_B
Cassette relay PCB
J702
-A5
-A4
-A3
-A2
-A1
OP_M_COM
OP_M_A
OP_M_A*
OP_M_B
OP_M_B*
J706
-1
-2
-3
-4
-5
-5
-4
-3
-2
-1
M101
Cassette motor

Figure 8-103

4. Pick-up/Feeding Sequence

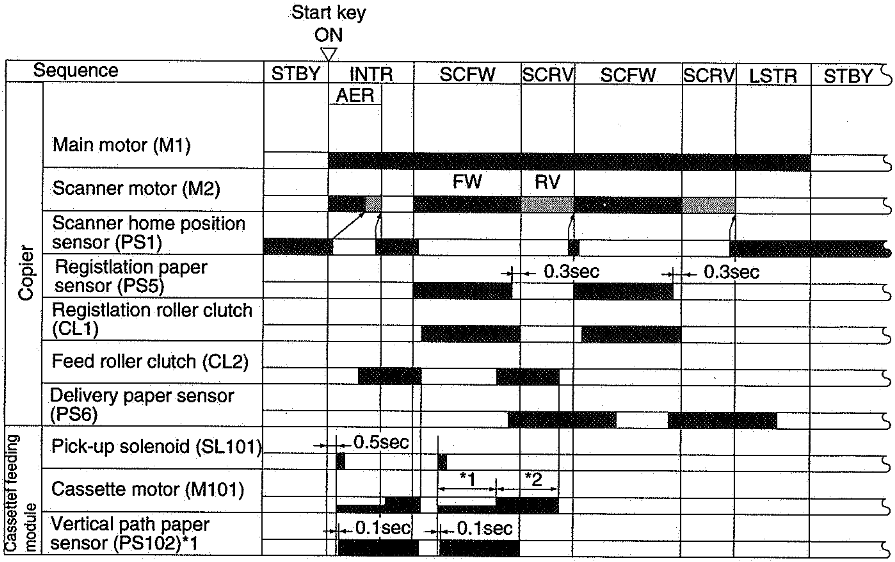
• NP7161/NP7160 (A4, 2 sheets)


Start key ON
Sequence
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
Copier
Main motor (M1)
Scanner motor (M2)
FW
RV
Scanner home position sensor (PS1)
Registlation paper sensor (PS5)
0.3sec
0.3sec
Registlation roller clutch (CL1)
Feed roller clutch (CL2)
Delivery paper sensor (PS6)
Cassettef feeding module
Pick-up solenoid (SL101)
0.5sec
Cassette motor (M101)
*1
*2
Vertical path paper sensor (PS102)*1
0.1sec
0.1sec

*1: 105mm/sec *2: 210mm/sec

Figure 8-104a

• NP7210 (A4, 2 sheets)


Start key ON
Sequence
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
Copier
Main motor (M1)
Scanner motor (M2)
FW
RV
Scanner home position sensor (PS1)
Registlation paper sensor (PS5)
0.3sec
0.3sec
Registlation roller clutch (CL1)
Feed roller clutch (CL2)
Delivery paper sensor (PS6)
Cassettef feeding module
Pick-up solenoid (SL101)
0.5sec
Cassette motor (M101)
*1
*2
Vertical path paper sensor (PS102)*1
0.1sec
0.1sec

*1: 105mm/sec *2: 210mm/sec

Figure 8-104b

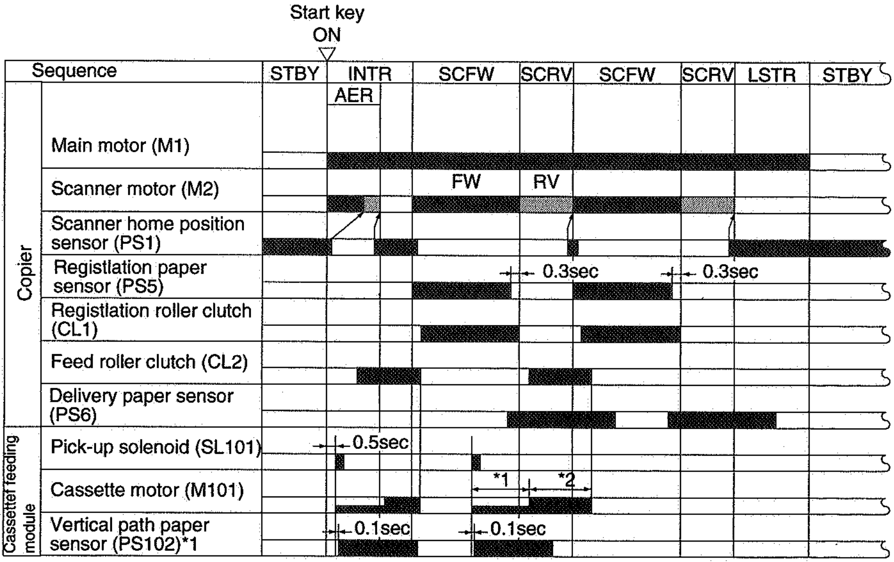
The cassette unit is equipped with a vertical path paper sensor (PS102).

Jamming may occur during continuous copying if the next sheet of paper to be picked up stops in a position where it is protruding from the cassette in the preceding pick-up operation, and there is no interval between the leading edge of this sheet and the trailing edge of the previous sheet in the next pick-up operation. The sensor is provided to prevent this from happening.

If the next sheet activates the sensor (PS102) in the preceding pick-up operation, feeding of the next sheet is delayed in order to ensure an interval after the previous sheet.

If the cassette motor (M101) is running at full-speed rotation of 210mm/sec when the pick-up roller is operating, this may lead to a failure of stepping out due to pressure of the pick-up roller on the paper. The motor should, therefore, be driven at half-speed rotation of 105mm/sec until the paper can be withdrawn from the pick-up roller.

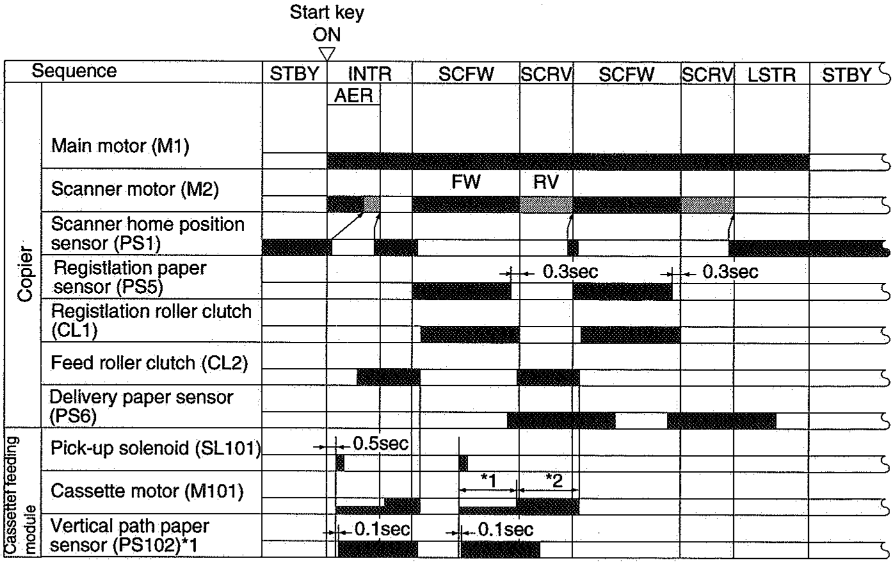
• Vertical Path Paper Control of NP7161 and NP7160 (A4, 2 sheets)



*1: 105mm/sec *2: 210mm/sec

Figure 8-105a

• Vertical Path Paper Control of NP7210 (A4, 2 sheets)


Start key
ON
Sequence
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
Copier
Main motor (M1)
Scanner motor (M2)
FW
RV
Scanner home position sensor (PS1)
Registlation paper sensor (PS5)
0.3sec
0.3sec
Registlation roller clutch (CL1)
Feed roller clutch (CL2)
Delivery paper sensor (PS6)
Cassettef feeding module
Pick-up solenoid (SL101)
0.5sec
Cassette motor (M101)
*1
*2
Vertical path paper sensor (PS102)*1
0.1sec
0.1sec

*1: 105mm/sec *2: 210mm/sec

Figure 8-105b

C. Waste Toner Swing Control

1. Outline

To ensure that the waste toner in the waste toner box attached to the copier is level, the copier is equipped with a waste toner box swing cam.

The waste toner box swing cam is driven by the cassette motor (M101) according to operation of the cam home position sensor (PS104).

This function only works when the power switch is on. (It is not activated when the door switch (DS1) on the copier is switched on or off.)

If the cam home position sensor (PS104) remains on or off for more than one second while the waste toner box swing cam is in operation, the E904 error code will be displayed on the control panel.

2. Summary of Operation

1) After the power is switched on, the cassette motor (M101) starts to rotate in the opposite direction to pick-up operation.
2) The cam rotates during the time between the cam home position sensor (PS104) coming on and going off, and the slider descends, lowering the waste toner box.
3) When the cam home position sensor (PS104) is detected as changing from on to off, the waste toner box swing cam rotates until the sensor comes on again, and the slider ascends, raising the waste toner box.
4) When the cam home position sensor (PS104) is detected as coming on, the waste toner box swing cam rotates approx. 135° and stops at the starting position.

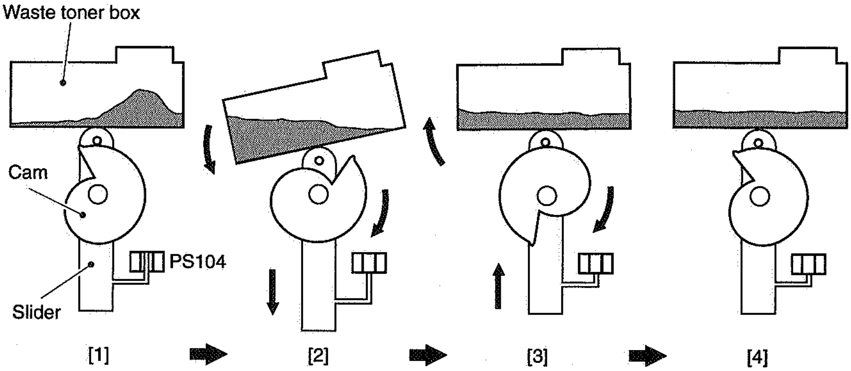


Figure 8-106

II. JAM DETECTION

A. Outline

The copier is equipped with the sensor described below, to detect whether the paper is being fed normally during pick-up and feeding from the cassette unit.

- Registration Paper Sensor (PS5)

Jamming is judged to have occurred depending on whether or not there is any paper in the sensor assembly during check timing stored in advance in the microcomputer. If jamming is indicated, the microcomputer stops the machine immediately and the jam indicator on the control panel starts to flash.

The microcomputer assumes jamming has occurred in the following circumstances.

a. When there is paper left in the sensor assembly when the power is switched on, after warm-up or during standby (Power-On jam)

b. When the paper does not reach the sensor assembly within the prescribed time (Delay jam)
   1. Registration delay jam due to activation of the registration paper sensor (PS5)

c. When the paper does not pass through the sensor assembly within the prescribed time (Stationary jam)
   1. Registration stationary jam due to activation of the registration paper sensor (PS5)

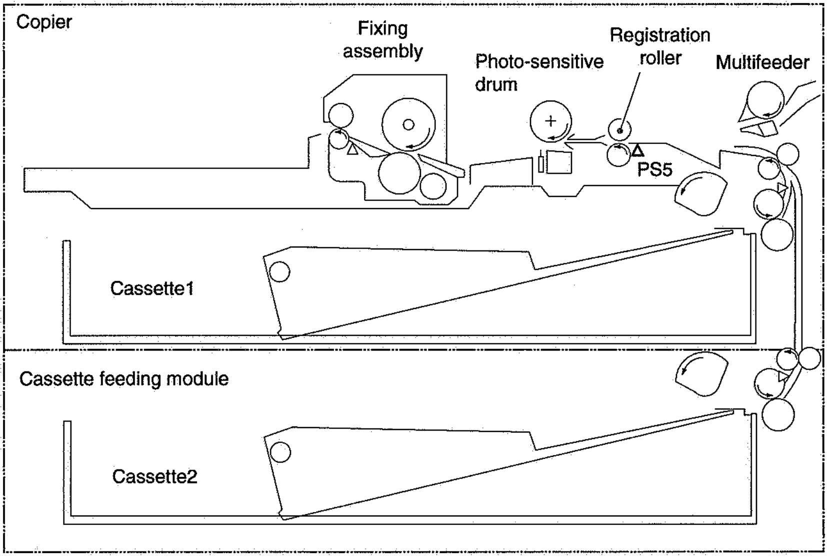


Figure 8-201

B. Jam Detection Sequence

1. Registration Delay Jam

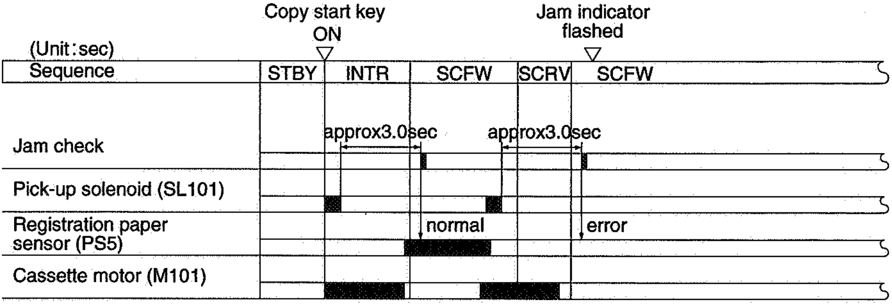
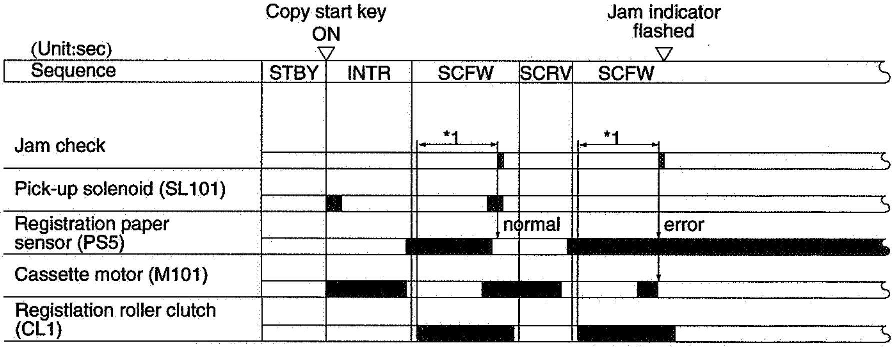

Copy start key ON
Jam indicator flashed
(Unit:sec)
Sequence
STBY
INTR
SCFW
SCRV
SCFW
approx3.0sec
approx3.0sec
Jam check
Pick-up solenoid (SL101)
Registration paper sensor (PS5)
normal
error
Cassette motor (M101)

Figure 8-202

2. Registration Stationary Jam


Copy start key ON
Jam indicator flashed
(Unit:sec)
Sequence
STBY
INTR
SCFW
SCRV
SCFW
*1
*1
Jam check
Pick-up solenoid (SL101)
Registration paper sensor (PS5)
normal
error
Cassette motor (M101)
Registlation roller clutch (CL1)

*1 : Varies according to paper size

Figure8-203

III. DISASSEMBLY & ASSEMBLY

The copier may be disassembled and assembled as shown here. Pay attention to the copier's mechanical characteristics along with the steps for disassembly/assembly.

Important:

1. Turn off the power and disconnect the power plug to ensure safety whenever disassembling/ assembling the copier.
2. Unless otherwise noted, assemble the parts by reversing the steps used to disassemble them.
3. Identify the screws by type (length, diameter) to avoid use in the wrong location.
4. Use a washer where needed. The mounting screws used for the grounding wire and varistor come with a washer to ensure electric continuity. Do not forget to use these washers.
5. As a rule, do not operate the copier with any of its parts removed.
6. As screws with a broader pitch than those used in the other covers are used in the rear cover and other parts of the copier, never use screws in parts other than where they originally came from.

A. External Cover

- [1] Cassette
- [2] Upper front cover
- [3] Right door
- [4] Rear cover (2)

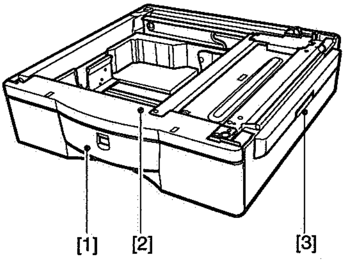


Figure 8-301

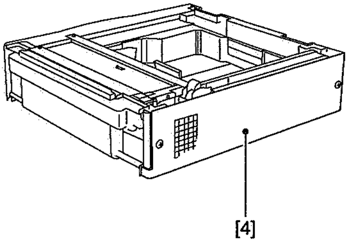


Figure 8-302

1. Removing the Upper Front Cover

1) Remove the cassette.
2) Holding the two hooks [1], remove the upper front cover [2].

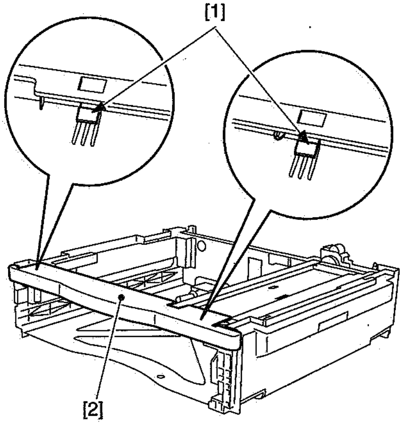


Figure 8-303

B. Drive Assembly

1. Removing the Pick-Up Drive Assembly

1) Remove the rear cover of the cassette unit.
2) Remove the two connectors [1] and three fitting screws [2], then remove the pick-up drive assembly [3].

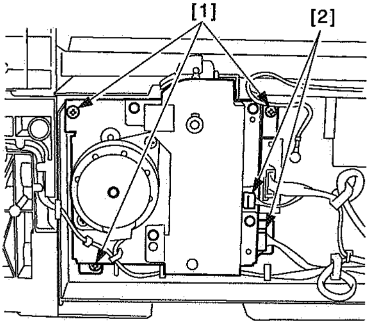


Figure 8-304

2. Removing the Cassette Motor

1) Remove the pick-up drive assembly.
2) Remove the connector [1], then remove the harness from the harness guide.

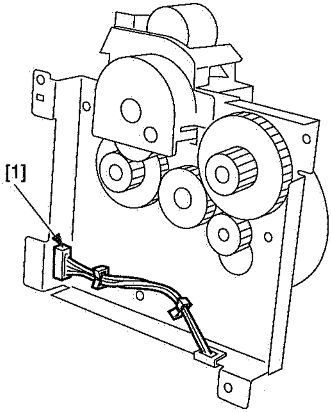


Figure 8-305

3) Remove the two fitting screws [2], then remove the cassette motor [3].

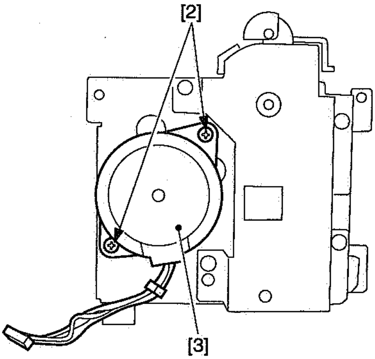


Figure 8-306

C. Pick-Up Assembly

1. Removing the Pick-Up Rollers

1) Remove the cassette, then remove the upper front cover.
2) Remove the stepped screw [1] and pull out the roller support plate [2].
3) Remove the pick-up roller assembly [3].

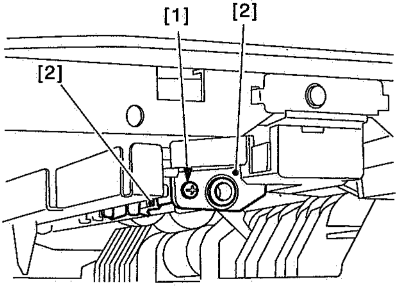


Figure 8-307

4) Holding the part marked by the arrow, remove the four pick-up rollers [4].

Note:
When removing the pick-up roller assembly, take care not to lose the seat [5] in the insertion part at the back.

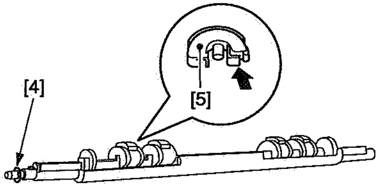


Figure 8-308

2. Installing the Pick-Up Rollers

Follow the procedures for removing the rollers in reverse order, taking care to note the following points.

- When fitting the rollers, match the protrusions on the rollers with the notches on the holder.
- Do not remove the rubber section of the pick-up rollers from the collar.
- When installing the pick-up roller assembly in the copier, make sure that the rollers are facing upward.

3. Removing the Pick-Up Assembly

1) Remove the cassette, then remove the upper front cover.
2) Remove the rear cover and open the right door.
3) Remove the two fitting screws [1], then remove the door sensor assembly [2].

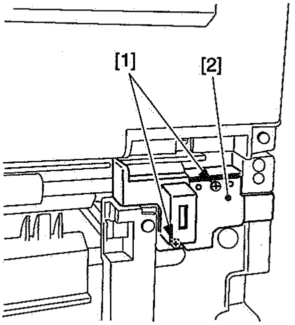


Figure 8-309

4) Move the E ring [3] and the bushings [4] on the ends of the extraction roller assembly towards the center, and remove the vertical path roller [5].

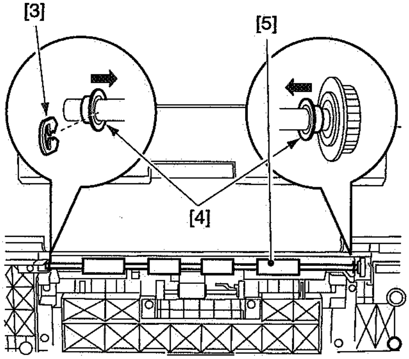


Figure 8-310

5) Remove the stepped screw [6] on the right side.

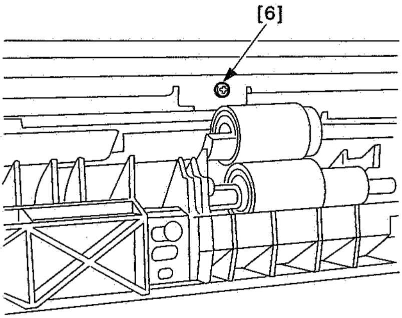


Figure 8-311

6) Remove the fitting screw [7] and slide the pick-up assembly [8] off.

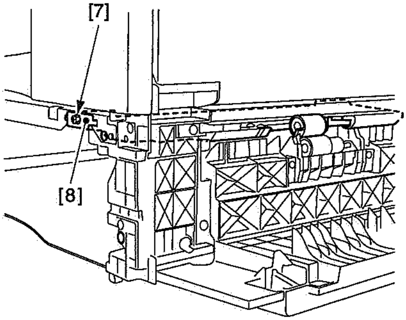


Figure 8-312

4. Removing the Feed Rollers

1) Remove the separation roller assembly.
2) Holding the claw [A], remove the feed rollers [2] in the direction shown by the arrow.

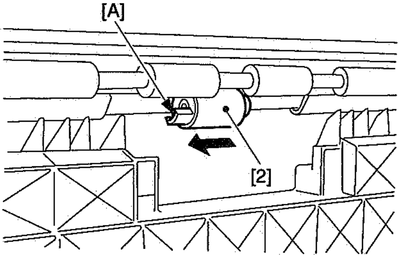


Figure 8-313

5. Removing the Separation Rollers

1) Open the right door.
2) Remove the two fitting screws [1] , then remove the separation roller assembly [2].

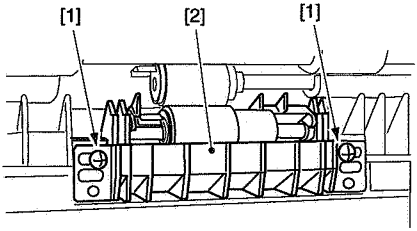


Figure 8-314

3) Remove the roller cover [3].

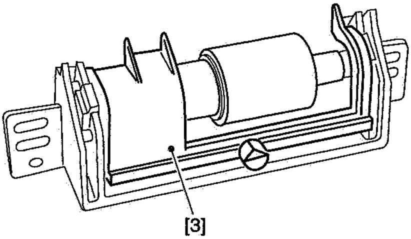


Figure 8-315

4) Remove the two bushings [4] and two springs [5].

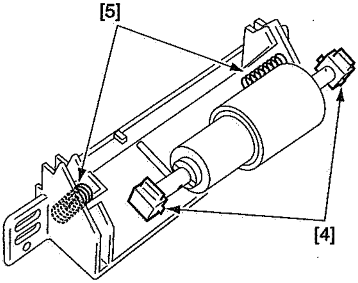


Figure 8-316

5) Remove the separation roller [6] while pushing the claw [A] with a flat-blade screwdriver or similar object.

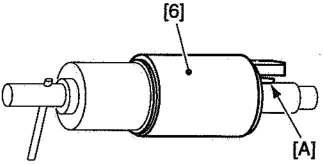


Figure 8-317

6. Installing the Separation Rollers

Follow the procedures for removing the separation rollers in reverse order, taking care to note the following points.

- When installing the separation rollers, insert the pin [1] into the groove [2] in the holder.
- Install the roller cover so that it presses against the bushings.

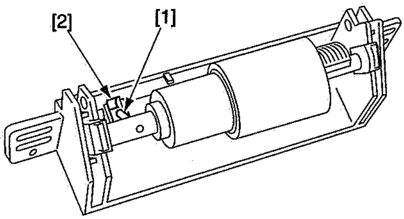


Figure 8-318

D. Cassette Size Switch Assembly

1. Removing the Cassette Size Switch

1) Remove the cassette.
2) Remove the fitting screw [1], then remove the cover [2].

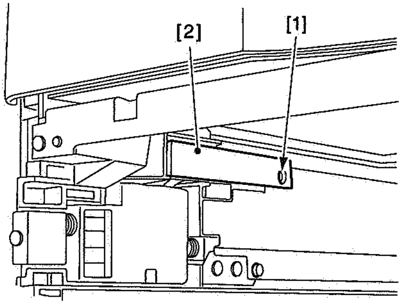


Figure8-319

3) Remove the fitting screw [4] holding the grounding wire [3].

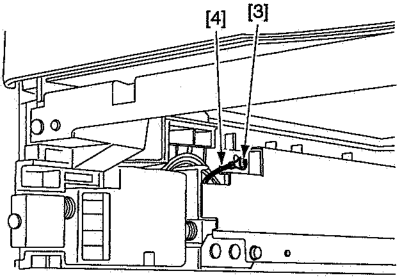


Figure 8-320

4) Remove the two fitting screws [5] and the two screws [6] in the rear of the main body, then remove the grounding plate [7].

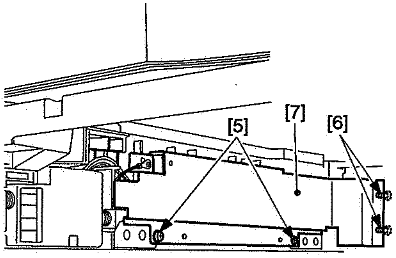


Figure 8-321

5) Remove the connector [8], then remove the harness [9] from the harness guide.

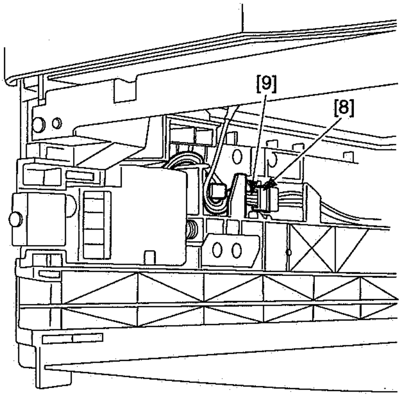


Figure 8-322

6) Remove the fitting screw [10], then remove the stopper [11].

7) Remove the cassette switch assembly [12].

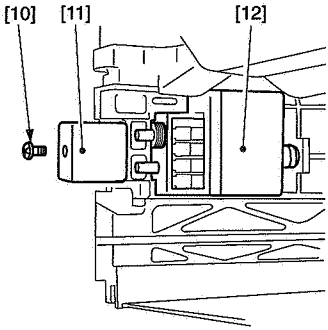


Figure 8-323

8) Unhook the hook [13], then remove the cassette size switch [14].

Note:
After installing the cassette size switch assembly, check that the cassette size switch assembly
slides properly using the spring [15].

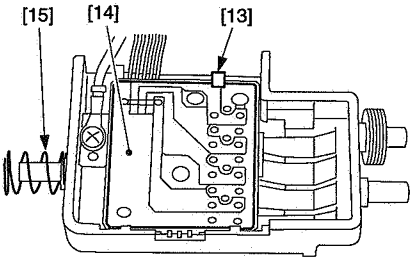


Figure 8-324

E. Cassette Relay PCB

1. Removing the Cassette Relay PCB

1) Remove the rear cover.
2) Remove the three connectors [1].
3) Remove the two fitting screws [2] and two locking supports [3], then remove the cassette unit relay PCB [4].

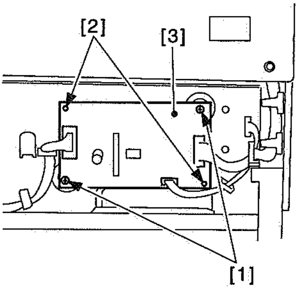


Figure 8-325

CHAPTER 9

INSTALLATION

This chapter introduces requirements for the site of installation, and shows how the copier may be installed using step-by-step instructions.

I. SELECTING THE SITE 9-1
II. UNPACKING AND INSTALLATION 9-2
  A. Unpacking 9-2
  B. Removing the Metal Fixings 9-3
  C. Mounting the Drum Unit 9-4
  D. Cleaning the Parts and Making Checks .. 9-6
  E. Checking the Images/Operations and User Mode 9-8
  F. Supplying Toner 9-10
III. RELOCATING THE MACHINE 9-12
IV. INSTALLING THE CONTROL CARD IV N 9-13
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  C. Installing the Mirror Heater 9-29
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I. SELECTING THE SITE

Check the site of installation against the following requirements. If possible, visit the site in advance of the delivery of the machine.

1. There must be a dedicated power outlet for exclusive use by the copier capable of providing the rated voltage (±10%).
2. The temperature must be 7.5 to 32.5°C (45.5 to 90.5°F), and humidity must be 5% to 85% RH. (Avoid areas near a water faucet, water boiler, humidifier, and refrigerator.)
3. Avoid areas near a source of fire and areas subject to dust or ammonia gas. Avoid direct rays of the sun. As necessary, provide curtains.
4. The amount of ozone generated by the copier is of a level not affecting the health of the individuals around it. Some individuals, however, may find its smell unpleasant. Be sure that the room is properly ventilated.
5. Select a well-ventilated area. If multiple copiers are to be installed, in particular, make sure that the exhaust from one will not be drawn into the vent of another.
6. Make sure that the copier will be level.
7. Keep the copier 10 cm (3.9 in) or more away from any wall to provide adequate space for machine operation.

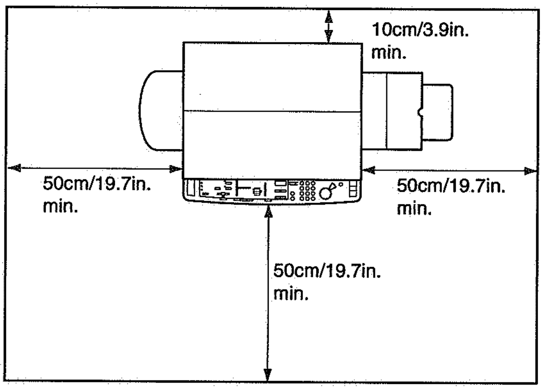


Figure 9-101

II. UNPACKING AND INSTALLATION

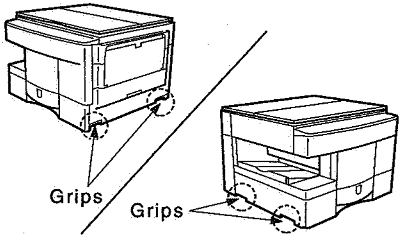
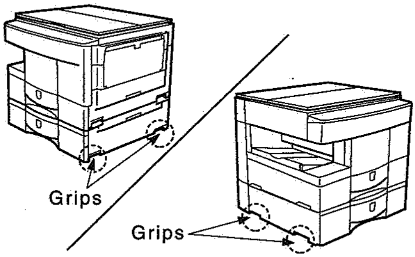
When a piece of metal is brought in from a cold to warm place, droplets of water tend to form on its surface. This phenomenon is known as *condensation*, and copiers suffering from condensation can generate blank copies.

If the copier has been brought in from a cold place, keep it unpacked for one hour or more before starting the installation work.

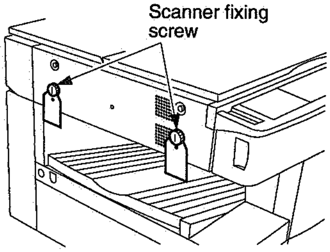
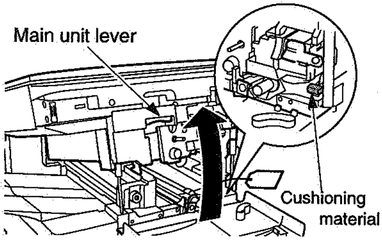
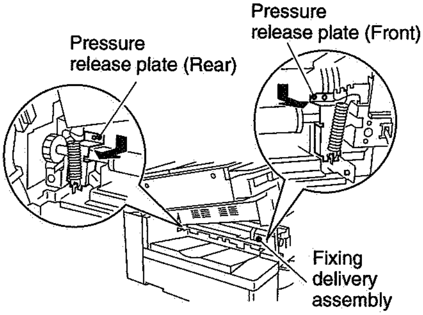
The copier weighs about 42 kg/92.4 lb (about 53.8 kg/118.5 lb)*. Be sure to work in a group of two when lifting it.

* In case Cassette Feeding Module installed.

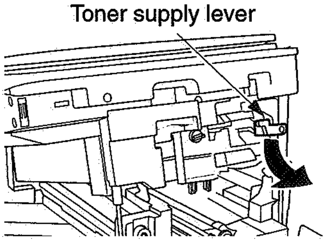
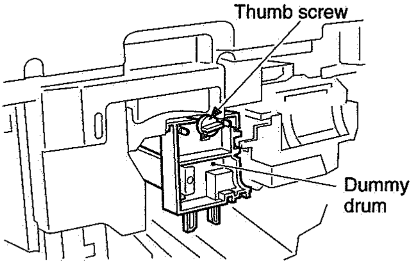
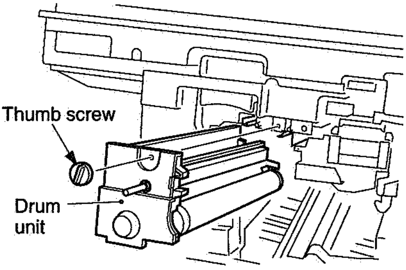
A. Unpacking

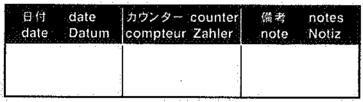
Step	Work	Checks/remarks
1	Open the shipping box, and take out the two cardboard boxes.	
2	Open the cardboard boxes, and take out the attachments.	Check to make sure that none of the following is missing: • copy tray • power cord • drum unit • User's Manual • waste toner case (3 pc.) • waste toner case bag (4 pc.) • top unit close label
3	Holding the grips at the bottom (both sides), move the copier to the site of installation.	<Front cassette 1pc. type>  <Front cassette 2pc. type> 

B. Removing the Metal Fixings

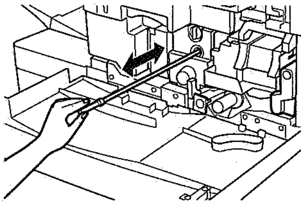
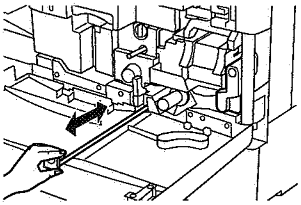
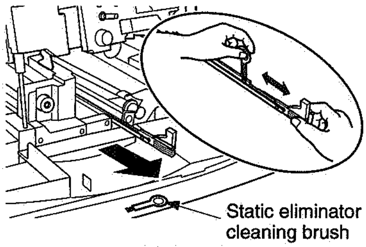
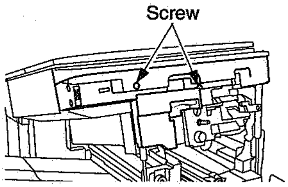
Step	Work	Checks/remarks
1	Remove the packing tape, cushioning material, protective sheet of the copyboard glass, and protective sheet of the size index.	Check to make sure that the covers are free of scratches and dents.
2	Slide out the cassette, and remove the packing tape and the cushioning material from inside.	
3	Slide the cassette into the copier.	
4	Remove the two scanner fixing screws from the copier's left side. (Store away the scanner fixing screw for possible relocation of the machine.)	 Scanner fixing screw
5	Open the front door, and shift up the opening/closing lever to open the copier top. Remove the metal fixing from the opening/closing hook (right). (You will not be using the removed metal fixing.)	 Main unit lever Cushioning material
6	While opening the delivery assembly, remove the fixing assembly releasing plate (1 each at front and rear). (You will not be using the removed fixing assembly releasing plate.) **Caution:** • Take core not to damage the surface of the fixing roller. • Take care not to damage the separation claw.	 Pressure release plate (Front) Pressure release plate (Rear) Fixing delivery assembly

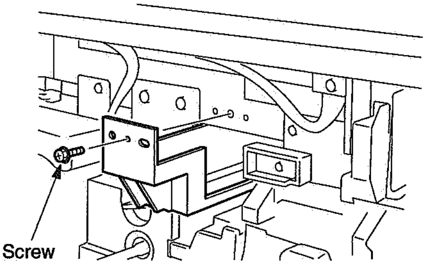
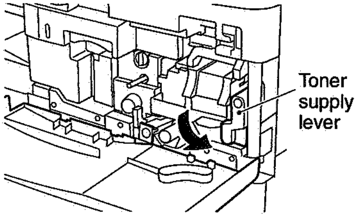
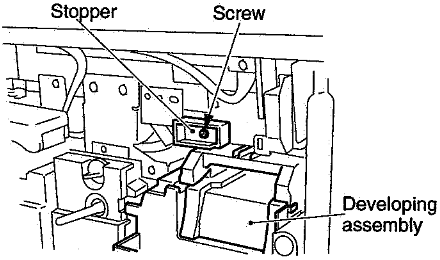
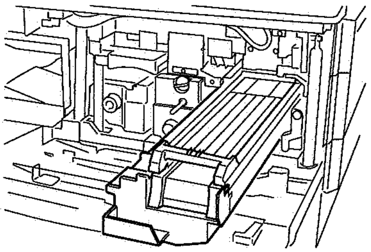
C. Mounting the Drum Unit

Step	Work	Checks/remarks
1	Turn the toner supply lever counterclockwise to unlock the developing assembly.	
2	Remove the thumb screw, and remove the dummy drum. (You will be using the thumb screw when mounting the drum unit. Store away the dummy drum for possible relocation of the machine.)	
3	Take out the drum unit from the box, and remove the cushioning material and the protective sheet. **Caution:** • Take care not to damage the surface of the photosensitive drum. • Take care not to subject the photosensitive drum to light unnecessarily.	Keep the labels for later use.
4	Set the drum unit to the copier by sliding it along the rails, and secure it in place using the thumb screw used to fix the dummy drum in place.	

Step	Work	Checks/remarks
5	Fill out the label that came with the drum unit, and attach the label to the front cover of the drum unit.	 日付 date date Datum カウンター counter compteur Zahler 備考 notes note Notiz
6	Turn the toner supply lever clockwise to lock the developing assembly in place; then, close the copier top.	

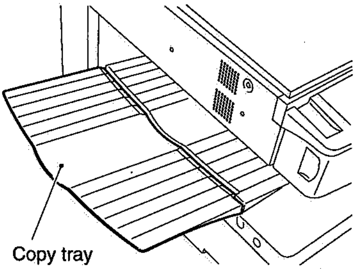
D. Cleaning the Parts and Making Checks

Step	Work	Checks/remarks
1	Clean the charging wire using the primary charging wire cleaning lever.	
2	Clean the charging wire using the transfer charging wire leaning lever.	
3	Take out the static eliminator, and clean it using the static eliminator cleaner stored behind the front door. Thereafter, set the static eliminator and the static eliminator cleaner back to their initial positions.	Clean as if to sweep the inside of the groove of the static eliminator. 
4	Remove the inside cover (2 screws).	

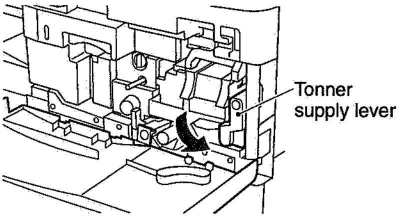
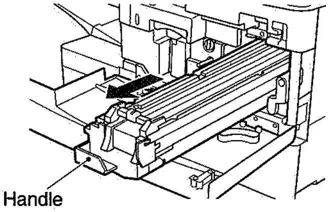
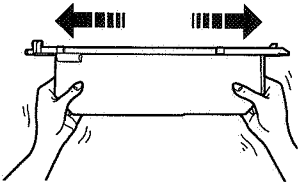
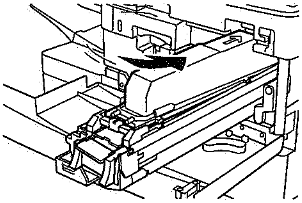
Step	Work	Checks/remarks
5	Take out the dust-proofing glass (1 screw), and dry wipe it with lint-free paper. Then, mount it back to the copier.	
6	Mount the inside cover.	
7	Turn the toner supply lever counterclockwise to unlock the developing assembly.	
8	Remove the stopper (1 screw), and take out the developing assembly. **Caution:** • Do not touch the developing cylinder. • Take care not to damage the developing cylinder.	Check to make sure that the developing cylinder is free of soiling and scratches. 
9	Set the developing assembly in the copier by sliding it along the rails; then, mount the stopper.	
10	Turn the toner supply lever clockwise to lock the developing assembly in place.	
11	Close the front door.	

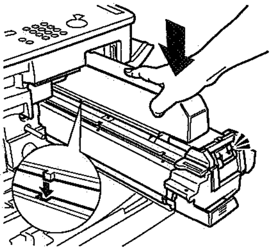
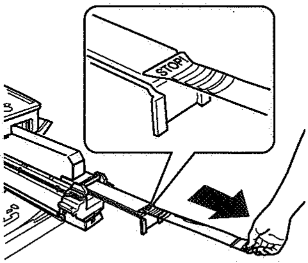
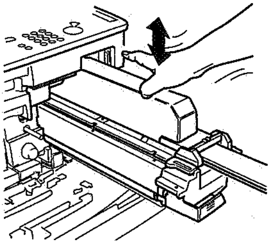
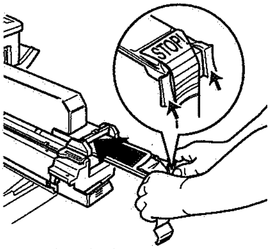
E. Checking the Images/Operations and User Mode

Step	Work	Checks/remarks
1	Connect the power cord to the copier, and connect the power plug to the outlet.	
2	Turn on the power switch.	• Check to make sure that the Paper indicator flashes. • Press the keys on the numeric keypad and the Clear key to make sure that copy counts are indicated correctly.
3	Supply toner.	See F. "Supplying Toner."
4	In standby state, execute service mode 401 (stir toner). **Steps** 1) Press the User mode key. 2) Hold down '2' and '8' on the numeric keypad at the same time for 0.5 sec or more. 3) Press the user mode key. 4) Check to see that '1' is indicated. 5) Press '4' on the numeric keypad. 6) Check to see that '4' is indicated. 7) Press the AE key. 8) Check to make sure that '401' is indicated. 9) Press the Start key to start stirring toner.	• This mode lasts about 4 min. • While this mode is effective, '401' is indicated; upon completion, '4' of '401' is flashed. **Caution:** While the mode remains on, do not turn off the power or open the front door.
5	Execute service mode 403 drum unit installation mode. **Steps** 1) Check to see that '401' is indicated. 2) Press '3' on the numeric keypad. 3) Check to see that '403' is indicated. 4) Press the Start key to start drum unit installation mode.	• This mode lasts about 40 sec. • While this mode is effective, '403' is indicated; upon completion, '4' of '403' is flashed. **Caution:** While the mode remains on, do not turn off the power or open the front door.

Step	Work	Checks/remarks
6	While the toner is being stirred, perform the following: 1) Set the cassette size to suit the needs of the user, and put copy paper inside the cassette. 2) Mount the copy tray to the copier.	To switch the cassette between AB and Inch, see the instructions under "Changing the Cassette Size (AB/Inch). (See p. 5-26.) 
7	When drum unit installation mode has been executed, press the Reset key to end service mode.	
8	Place the Test Sheet on the copyboard glass, and make copies using each cassette. Then, check the copy images.	• Check to make sure that there is no abnormal noise. • Check to make sure that as many copies as set are made normally. • Check the copies (images) made at each default reproduction ratio. If images are not optimum, perform the "Image Adjustment Basic Procedure." (p. 11-3) • Check to make sure that copying operation in each copying mode is normal. • Check to make sure that the counter operates normally.
9	Make user mode settings and service mode settings 5 to suit the user's needs.	
10	Clean up the area around the machine.	
11	If you are installing accessories (e.g., sorter), install them according to their respective Installation Procedures.	
12	Fill out the Service Sheet.	

F. Supplying Toner

Step	Work	Checks/remarks
1	Open the front door.	
2	Turn the toner supply lever counterclockwise to unlock the developing assembly.	
3	Holding the grip, pull the developing assembly to the front until it stops.	
4	Holding the toner cartridge horizontal, shake it left and right several times.	
5	Put the toner cartridge over the developing assembly, and push it in fully to the rear.	

Step	Work	Checks/remarks
6	Push the toner cartridge from above to lock it to the developing assembly.	Check to make sure that the opening tab of the toner cartridge has sprung to the front. 
7	Pull the opening tab to the front until the STOP line is in view.	
8	Tap lightly on the top of the toner cartridge so that the toner falls into the developing assembly.	
9	Push in the grip of the developing assembly so that the toner cartridge may be detached.	The toner cartridge will detach itself from the developing assembly when the grip of the developing assembly is pushed in to its initial position. 
10	Slide the developing assembly into the copier, and turn the toner supply lever clockwise to lock the developing assembly in place.	
11	Close the front door.	

III. RELOCATING THE MACHINE

If you need to relocate the machine by truck or any other means of transportation, perform the following:

Step	Work	Checks	Remarks
1	Make a copy in Direct.		
2	Take out all copy paper from the cassette.		
3	Excute '440' in service mode. The scanner, lens, and No.4/No.5 mirror unit move to the position for transportation.		
4	Turn off the power switch, and disconnect the power plug from the power outlet.		
5	Secure the scanner in place using the two scanner fixing screws from the left side of the copier.		Use the screws removed during installation work.
6	Take out the drum unit, and mount the dummy drum.	The drum unit must be transported separately.	
7	Remove the copy tray.		
8	Tape the front door, multifeeder tray, and cassette in place.		
9	Place A3 copy paper on the copyboard glass, and tape the copyboard in place.		

IV. INSTALLING THE CONTROL CARD IV N

1) Remove the screw [1] from the right side of the upper rear cover, and detach the face cover [2].
2) Cut off the face plate [3].

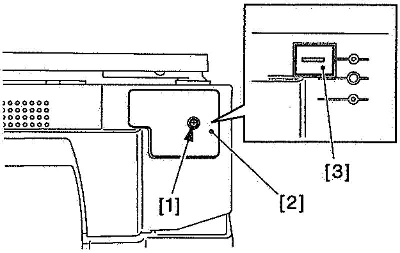


Figure 9-401

3) Lead out the harness, and disconnect the shorting connector [4]; then, connect the connector [5] of the Control Card IV N to the copier's connector [6].

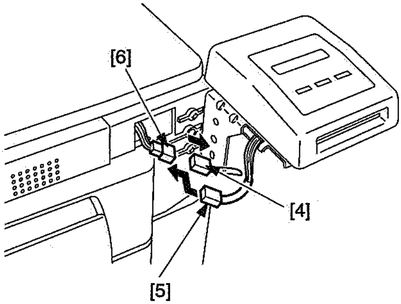


Figure 9-402

4) Push in the harness and the connector into the copier, and install the Control Card IV N to the copier using the screw [7].

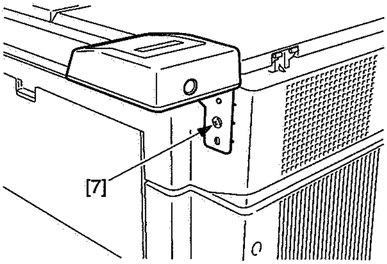


Figure 9-403

5) Connect the copier's power plug, and turn on the power switch to check the operation of the Control Card IV N.

V. INSTALLING THE REMOTE DIAGNOSTIC DEVICE II

Keep the following in mind when installing the Remote Diagnostic Device II to the copier:

1. Be sure to observe the relevant laws and regulations of the country.
2. Be sure to check that the copier has properly been installed before starting the work.
3. Be sure to keep the copier's power plug disconnected during the work.
4. Be sure to identify the screws by type (length, diameter) and location.
5. Be sure to set the settings data to the computer at the service station in advance.

1) Remove the two screws [1], and detach the top cover [2].

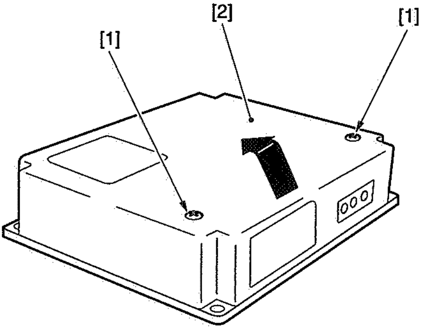


Figure 9-501

2) Connect the connector [3] of the power supply unit to the connector [4] as shown.

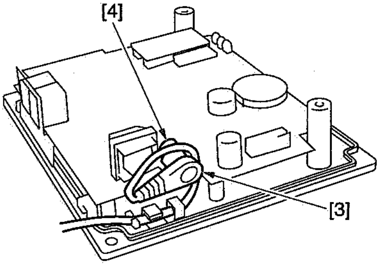


Figure 9-502

3) Remove the copier's rear cover; then, remove the sheet [5], and cut off the face plate [6].

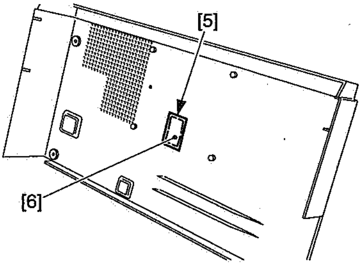


Figure 9-503

4) Lead the harness through the opening in the rear cover made by cutting off the face plate in step 3), and connect the connector [7] and the copier's connector [8] (8P). (At this time, be sure to fit the harness in the harness guide as shown.)

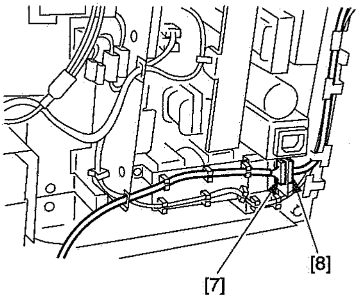


Figure 9-504

5) Mount the rear cover and the grounding wire [9] (attachment) to the copier, and secure the device to the rear cover together with the grounding wire [9] with four screws [10] (use the screws that come with the device).

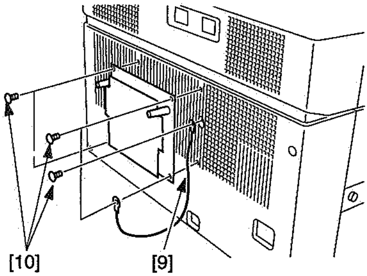


Figure 9-505

6) Remove the slack from the cable between the copier and the device, and bundle together any excess length and secure it in place with the harness band [11].

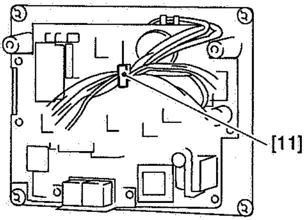


Figure 9-506

7) Shift bits 4 of the DIP switch (SW2) [12] on the device's PCB to OFF (so that the communication with the copier will be serial communication).

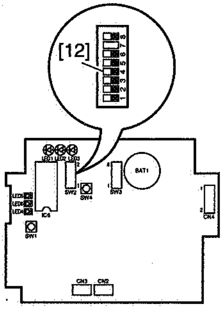

[12]
1
2
3
4
5
6
7
8
LED1 LED2 LED3
BAT1
SW2
SW4
SW3
IC6
SW1
CN4
CN3
CN2

Figure 9-507

8) If IC6 [13] is mounted on the PCB, shift bit 7 of the DIP switch (SW2) to ON; otherwise, keep bit 7 at OFF.

Caution:
1. If the ROM (IC6) [13] is not mounted, you need not mount one newly.
2. If you want to mount the ROM (IC6) [13] for upgrading or replace it, be sure to shift bit 7 of the DIP switch [14] (SW2) to ON.

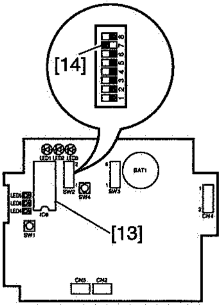

[14]
1
2
3
4
5
6
7
8
[13]
LED1 LED2 LED3
BAT1
SW2
SW4
SW3
IC6
SW1
CN4
CN3
CN2

Figure 9-508

9) Set each bit of the DIP switch (SW3) [15] as indicated in Table 9-501.

Switch	Setting	Description
SW3-1	All OFF	
SW3-2		
SW3-3	ON	
SW3-4	ON	selects push pulse for RDD circuit configuration
	OFF	selscts dial pulse for RDD circuit configuration
SW3-5	ON	sets dial pulse speed to 20 PPS
	OFF	sets dial pulse speed to 10 PPS
SW3-6	–	reserved

Table 9-501

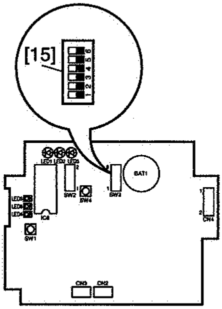

[15]
1
2
3
4
5
6
LED1 LED2 LED3
BAT1
SW2
SW4
SW3
IC6
SW1
CN4
CN3
CN2

Figure 9-509

10) Connect the power supply unit to the power plug, and check to make sure that LED1 [16] (green) turns on.

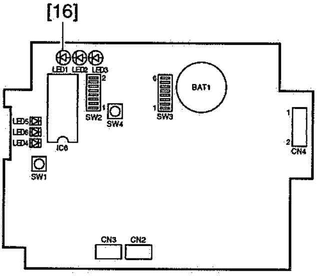

[16]
LED1
LED2
LED3
2
1
SW2
SW4
6
1
SW3
BAT1
1
2
CN4
LED5
LED6
LED4
IC6
SW1
CN3
CN2

Figure 9-510

11) Execute RAM clear.
Set each bit of the DIP switch [17] (SW2) as indicated in Table 9-502, and press the push switch [18] (SW4). A press should turn on LED5 [19] (red).

SW2 bits	Settings
SW2-1	OFF
SW2-2	OFF
SW2-3	ON
SW2-4	OFF
SW2-5	OFF
SW2-6	OFF
SW2-7	See step 8).
SW2-8	OFF

Table 9-502

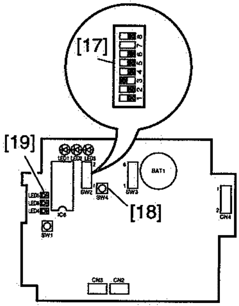

[17]
8
7
6
5
4
3
2
1
[19]
[18]

Figure 9-511

12) After making sure that LED5 [19] (red) has turned on, set each bit of the DIP switch [17] (SW2) as indicated in Table 9-503, and press the push switch [18] (SW4). A press should turn off LED5 [19] (red), indicating that RAM clear has ended.

SW2 bits	Settings
SW2-1	OFF
SW2-2	OFF
SW2-3	OFF
SW2-4	OFF
SW2-5	OFF
SW2-6	ON
SW2-7	See step 8).
SW2-8	OFF

Table 9-503

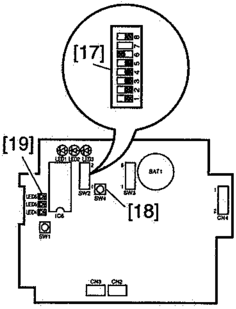

[17]
[19]
[18]
LED1 LED2 LED3
LED4
LED5
LED6
SW1
SW2
SW3
SW4
IC6
BAT1
CH4
CH3
CH2
1
2
3
4
5
6
7
8

Figure 9-512

13) Shift bit 6 of the DIP switch [20] (SW2) to OFF.

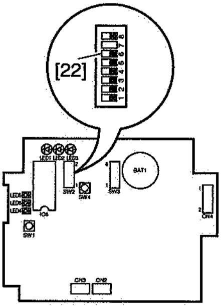

[22]
LED1 LED2 LED3
LED4
LED5
LED6
SW1
SW2
SW3
SW4
IC6
BAT1
CH4
CH3
CH2
1
2
3
4
5
6
7
8

Figure 9-513

14) Connect the telephone line to the device. If the device is connected on its own, connect the modular jack cable to the connector LINE [21]. If the extension function of the device is used, connect the existing telephone or fax to the connector TEL [22], and connect the telephone line to the connector LINE [21].

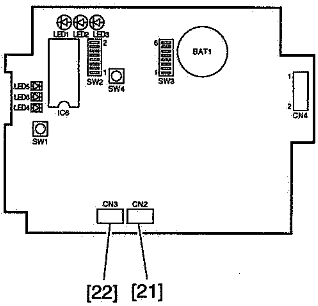

LED1
LED2
LED3
2
1
SW2
SW4
6
1
SW3
BAT1
1
2
CN4
LED5
LED6
LED4
IC6
SW1
CN3
CN2
[22]
[21]

Figure 9-514

15) Call the service station, and request initial settings for the device. (Upon reception, LED4 [23] (red) will start to flash.)

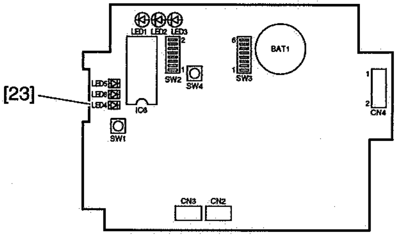

LED1
LED2
LED3
2
1
SW2
SW4
6
1
SW3
BAT1
1
2
CN4
[23]
LED5
LED6
LED4
IC6
SW1
CN3
CN2

Figure 9-515

16) Call the service station to find out whether the initial settings have been successfully made. Otherwise, execute RAM clear (steps 11) through 13)) once again and start over.

Caution:
Upon completion of each try, check with the service station to make sure that the settings have been made successfully.

17) Check if the device is capable of ringing up the computer at the service station.
Press the push switch [18] (SW4).
A press will turn on LED6 [24] (red): it will turn off upon completion of transmission, and it will flash upon failure.
Another press on the push switch (SW4) [18] while LED6 [24] is flashing will initiate transmission once again.
A press on the push switch (SW1) [25] while LED 6 [24] is flashing will cancel transmission attempts.

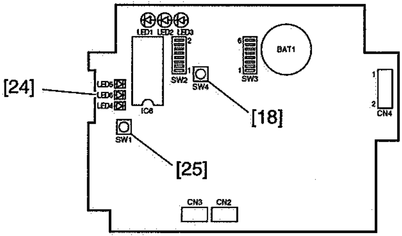

LED1 LED2 LED3
2
6
BAT1
1
SW2
SW4
1
SW3
[24]
LED5
LED6
LED4
IC6
[18]
1
2
CN4
SW1
[25]
CN3 CN2

Figure 9-516

18) Check to make sure that the communication with the copier is normal. Connect the copier's power plug, and turn on the power switch to see that LED2 [26] (orange) flashes.

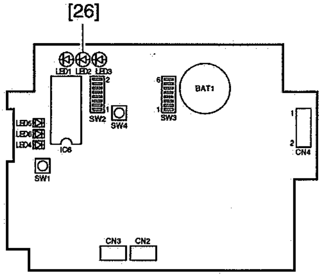

[26]
LED1 LED2 LED3
2
6
BAT1
1
SW2
SW4
1
SW3
LED5
LED6
LED4
IC6
1
2
CN4
SW1
CN3 CN2

Figure 9-517

19) Press the copier's Copy Start key so that LED3 [27] (pink) flashes in response.

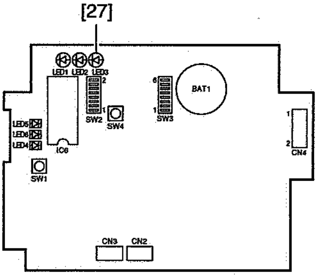

[27]
LED1 LED2 LED3
2
6
BAT1
1
SW2
SW4
1
SW3
LED5
LED6
LED4
IC6
1
2
CN4
SW1
CN3 CN2

Figure 9-518

20) Attach the switch settings label [28] on the device, and record the settings of each switch.
21) Secure the top cover [29] in place with two screws [30]. At this time, check to make sure that the cable is fixed in place with the cable guide and is not trapped by the top cover [29].

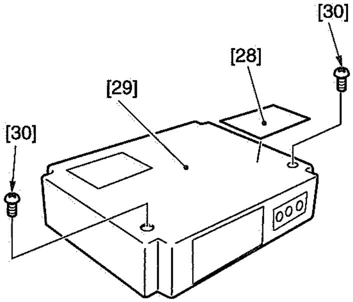


Figure 9-519

VI. INSTALLING THE ACCESSORY COUNTER

1) Open the front door; then, remove the inside cover, and cut off the face plate [1].

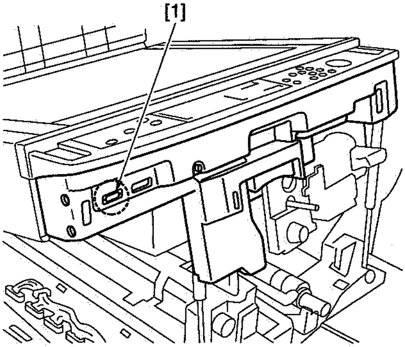


Figure 9-601

2) Remove the delivery lower cover, and mount the accessory counter [2] to the counter assembly.

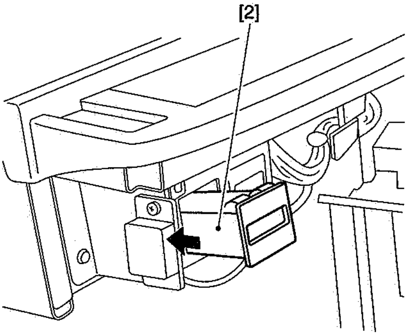


Figure 9-602

3) Connect the connector [3] of the accessory counter to the connector [4] of the counter assembly.

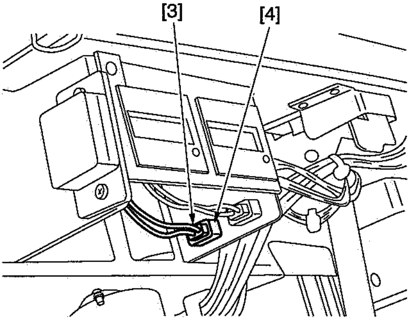


Figure 9-603

4) Remove the delivery lower cover, and set the DIP switch (SW102) on the DC controller PCB as indicated in Table 9-601.

SW102-5	SW102-6	Settings
OFF	OFF	Accessory counter not connected.
ON	OFF	Uses the accessory counter as a small-size copy counter.
OFF	ON	Uses the accessory counter as a large-size copy counter.
ON	ON	Not used

Table 9-601

5) Mount the delivery lower cover and the inside cover, and close the front door.
6) Connect the copier's power plug, and turn on the power switch to check the operation of each counter.

VII.PROCEDURE FOR INSTALLING THE ACCESSORY HEATER

A. Installing the Heater Switch

Prepare the parts shown in Figure 9-701 and assemble them as shown in Figure 9-702.

[1]	Heater Switch	1
[2]	Heater Switch Mount	1
[3]	Mini Clamp	1
[4]	Wire Clip	1
[5]	Fitting Screw (RS, tight, M3x6)	2
[6]	Heater Switch Label	1

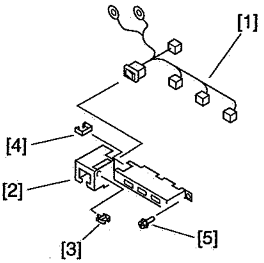


Figure 9-701

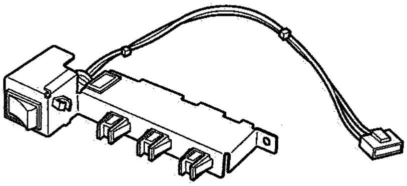


Figure 9-702

1) Affix the heater switch label [1] to the rear cover.
2) Remove the rear cover and cut off the blanking plate [2].
3) Install the heater switch [3] with the two fitting screws (RS, tight, M3x6) [4].
4) Pass the heater switch harness through the clamp and attach to the connector [5].

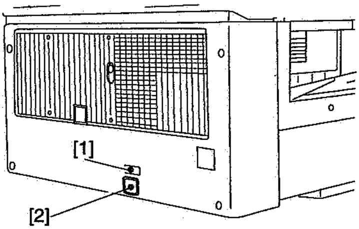


Figure 9-703

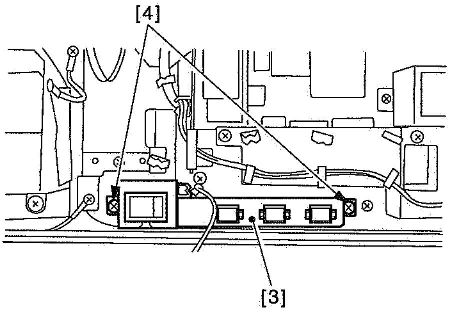


Figure 9-704

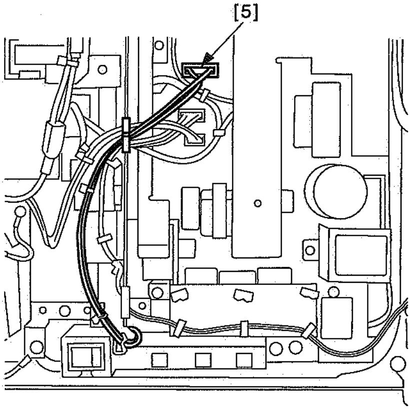


Figure 9-705

B. Installing the Cassette/ Drum Heater

Caution:
Before installing the cassette/drum heater, install the heater switch. (See p.9-25)

Prepare the parts shown in Figure 9-706 and assemble them as shown in Figure 9-707.

[1] Cassette/Drum Heater	1
[2] Heater Mount	1
[3] Mini Clamp	3
[4] Heater Fixing Screw (binding head, M3x6)	2
[5] Fitting Screw (RS, tight, M3x6)	2

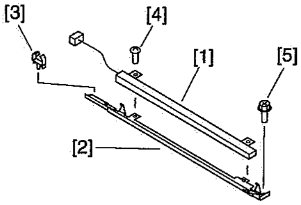


Figure 9-706

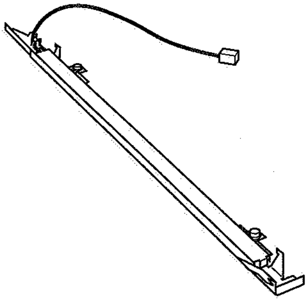


Figure 9-707

1) Remove the front door, drum unit, developing assembly, transfer corona assembly and cassette.
2) Hook the two hooks [1] of the cassette/drum heater in the notches in the main body and slide the heater to the rear.

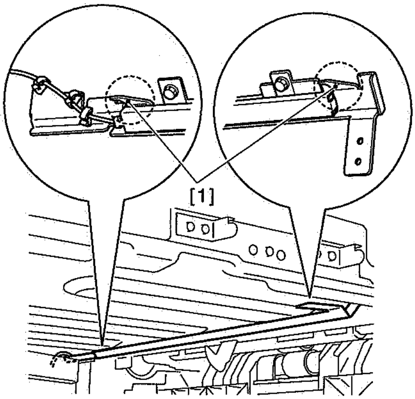


Figure 9-708

3) Fix with the two fitting screws (RS, tight, M3x6) [2].

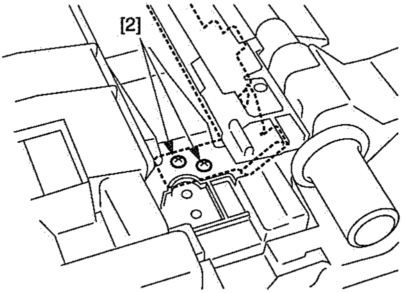


Figure 9-709

4) Pass the cassette/drum heater harness [3] through the harness guide and attach to the connector [4].

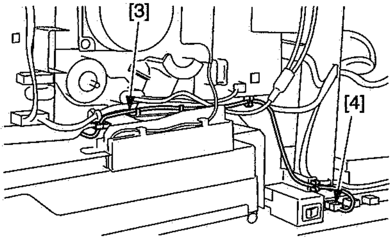


Figure 9-710

C. Installing the Mirror Heater

Caution:
Before installing the mirror heater, install the heater switch. (See p.9-25)

Prepare the parts shown in Figure 9-711.

[1] Mirror Heater 1
[2] Fitting Screw (RS, tight, M3x6) 2

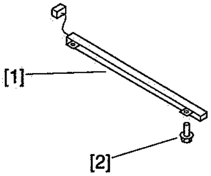


Figure 9-711

1) Remove the inside cover and upper delivery cover.
2) Install the mirror heater [1] with the two fitting screws (RS, tight, M3x6) [2].

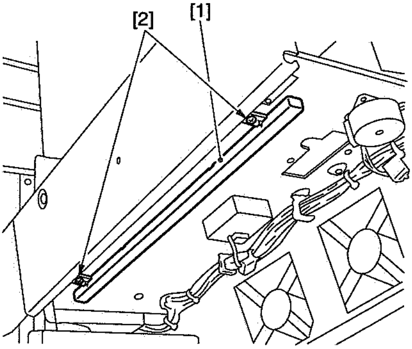


Figure 9-712

3) Pass the mirror heater harness [3] through the harness guide and attach to the connector [4].

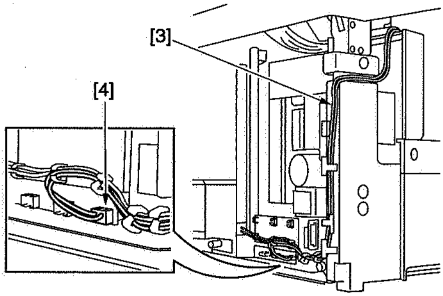


Figure 9-713

D. Installing the Cassette Heater

Caution:
Before installing the cassette heater, install the heater switch. (See p.9-25)

Prepare the parts shown in Figure 9-714 and assemble them as shown in Figure 9-715.

[1] Cassette Heater	1
[2] Heater Mount A	1
[3] Heater Mount B	1
[4] Mini Clamp	6
[5] Fitting Screw (RS, tight, M3x6)	4
[6] Relay Harness	1

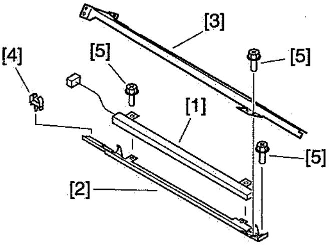


Figure 9-714

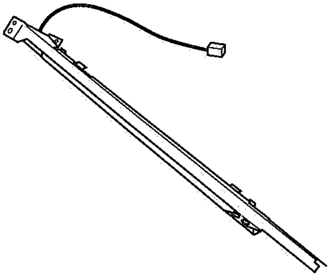


Figure 9-715

1) Remove the cassette from the cassette unit, then remove the upper front cover and rear cover.
2) Remove the rear cover from the main body of the copier.
3) Remove the two fitting screws [1], then remove the blanking plate [2].

Caution:
After removing the two fitting screws [1], keep it since it will be used again.

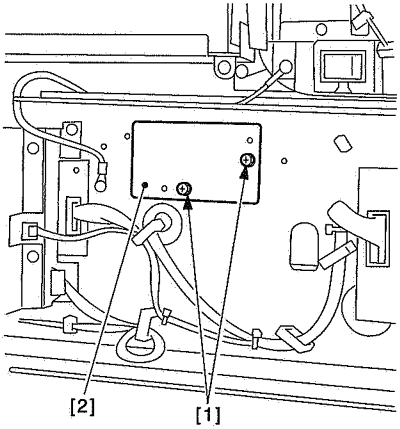


Figure 9-716

4) Remove the connector [3], then remove the harness from the harness guide to the position shown in the figure.

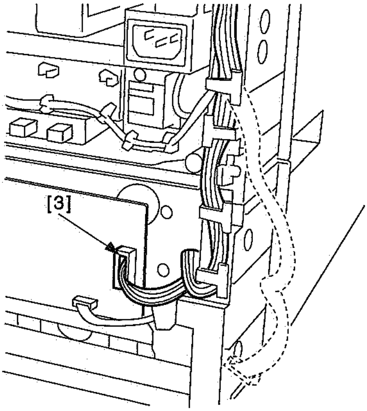


Figure 9-717

5) Attach the harness connector [4] to the heater switch [5] and draw the harness [6] along the harness guide.
6) Attach the harness that was removed in 4).

Note:
- Before attaching the harness that was removed in 4), lay the harness in position.
- Draw the cable so that harness band [6] locate the position indicated as Figure 9-718.

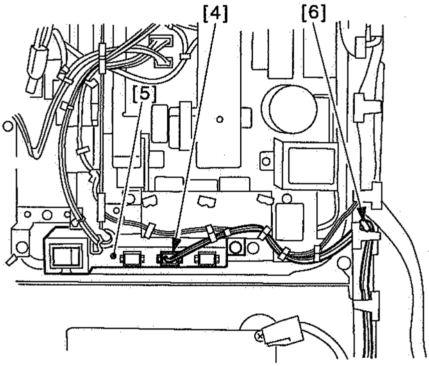


Figure 9-718

7) Insert the cassette heater from the rear of the main body into the hole [7] shown in the figure, then go round to the front of the main body and insert the front end of the cassette heater into the hole [8] shown in the figure.

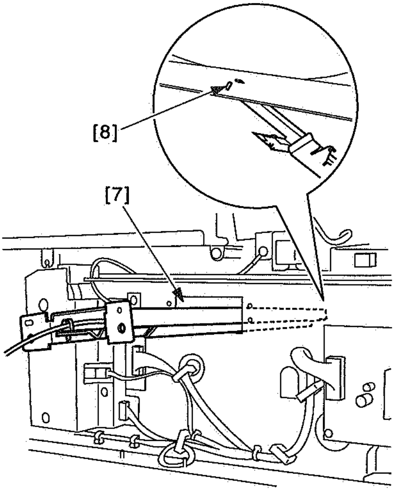


Figure 9-719

8) Install the cassette heater [10] with the two fitting screws [9] removed from the rear of the main body in 3).

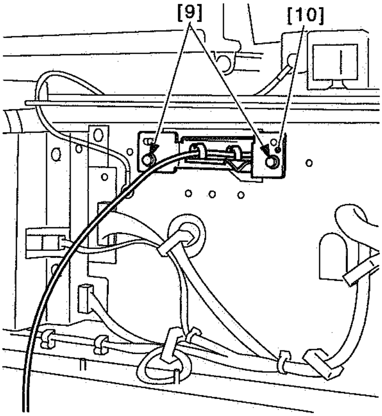


Figure 9-720

9) Attach the three mini clamps [11], lay the heater harness [12] and connect it to the relay harness connector [13].

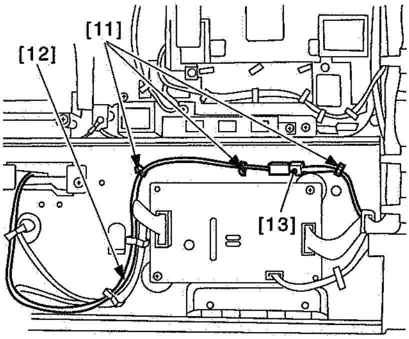


Figure 9-721

CHAPTER 10

MAINTENANCE AND SERVICING

This chapter provides tables of periodically replaced parts and consumables/durables and scheduled servicing charts.

I. PERIODICALLY REPLACED PARTS ... 10-1
  A. Copier ... 10-1
  B. Cassette Feeding Module ... 10-1
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III. SCHEDULED SERVICING CHART ... 10-4
IV. SCHEDULED SERVICING TABLE ... 10-6
  A. Copier ... 10-6
  B. Cassette Feeding Module ... 10-7

I. PERIODICALLY REPLACED PARTS

Some of the parts of the copier need to be replaced on a periodical basis to ensure a specific level of performance (regardless of external appearance or presence/absence of damage).

Plan replacement so that it coincides with a scheduled servicing visit.

A. Copier

As of December 1998

No.	Parts name	Parts No.	Q'ty	Expected life (copies)	Remarks
1	Transfer charging wire	FY3-0040-000	AR	60,000	
2	Ozone filter (exhaust)	FE5-3956-000	1	60,000	Or, 1 yr.

Note:
The above values are estimates only, and are subject to change based on future data.

B. Cassette Feeding Module

The cassette feeding module does not have a part to be replaced on a periodical basis.

II. CONSUMABLES AND DURABLES

Some of the parts of the copier may need to be replaced once or more because of wear or damage over the period of machine warranty. Replace them when they fail.

A. Copier

As of December 1998

No.	Parts name	Parts No.	Q'ty	Expected life (copies)	Remarks
1	Scanning lamp	FH7-3360-000	1	120,000	120V
		FH7-3361-000	1	120,000	230V
2	Pick-up roller	FE5-4199-000	2	120,000	
3	Feed roller	RF5-2490-000	1	120,000	
4	Separation roller	RF5-2490-000	1	120,000	
5	Multifeeder pick-up roller	FB1-8581-000	1	120,000	
6	Multifeeder separation pad	FE5-4132-000	1	120,000	
7	Static eliminator	FL5-0581-000	1	60,000	
8	Developing cylinder	FM5-0721-000	1	180,000	
9	Fixing upper roller	FE5-3912-000	1	180,000	
10	Fixing lower roller	FE5-3905-000	1	180,000	
11	Fixing upper separation claw	FB1-7075-000	5	180,000	
12	Fixing lower separation claw	FA2-9037-000	4	180,000	
13	Heat discharge roller	FE5-3932-000	1	120,000	
14	Delivery roller	FE5-3927-000	1	120,000	
15*	Dust-proofing filter	FE5-4237-000	1	300,000	
16*	Fixing heater	FH7-3366-000	1	300,000	120V
		FH7-3367-000	1	300,000	230V

*NP7210 only

Note:
The above values are estimates only, and are subject to change based on future data.

B. Cassette Feeding Module

As of December 1998

No.	Parts name	Parts No.	Q'ty	Expected life (copies)	Remarks
1	Pick-up roller	FE5-4199-000	4	120,000	
2	Feed roller	RF5-2490-000	1	120,000	
3	Separation roller	RF5-2490-000	1	120,000	

Note:
The above values are estimates only, and are subject to change based on future data.

III. SCHEDULED SERVICING CHART

Note:

1. As a rule, provide scheduled servicing every 60,000 copies.
2. Before setting out for a visit, check the Servicing Book, and take parts for which replacement is expected.

Step	Work	Checks	Remarks
1	Report to the person in charge.	Check the general condition.	
2	Record the counter reading.	Check the faulty copies.	
3	Make test copies (in Direct, Reduce, Enlarge).	a. density of images b. soiling of the background c. clarity of characters d. margin along the leading edge e. margin on the left/right f. fixing, registration (displacement), soling of backs g. abnormal noise h. counter operation	
4	Clean the optical assembly: • canning reflecting plate • lens • No. 1/2/3/4/5/6 mirror • dust-proofing glass		Use a blower brush; if dirt is excessive, use alcohol.
5	Check the waste toner case.	Collect the waste toner case is full.	
6	Replace the transfer charging wire, clean the transfer charging guide, and clean the transfer guide: • transfer guide (upper/lower) plate • transfer/separation charging assembly guide rail		Dry wipe with lint-free paper ; if necessary use alcohol.
7	Clean the separation/feeding assembly: • separation static eliminator • feeding assembly		
8	Clean the fixing/delivery assembly: • fixing (upper/lower) roller • separation claw (upper/lower)		Lubricant
9	Provide scheduled servicing according to the number of copies made.		

Step	Work	Checks	Remarks
10	Clean the copyboard cover and the copyboard glass.		Use alcohol.
11	Make test copies.		
12	Make sample copies.		
13	Put the sample copies in order, and clean up the area around the machine.		
14	Record the latest counter reading.		
15	Fill out the Service Sheet, and report to the person in charge.		

IV. SCHEDULED SERVICING TABLE

A. Copier

Caution:

1. Do not use solvents/oils other than those mentioned herein.
2. Keep the following in mind when cleaning/checking each charging assembly:
- Do not use a cloth having metal powder.
- Do not use a moist cloth. Dry wipe with lint-free paper, and use alcohol thereafter. Be sure that alcohol has dried completely before mounting back to the copier.

△ : Clean ● : Replace × : Lubricate □ : Adjust ◎ : Inspect

Unit	Item	Intervals					Remarks
		every 60,000	every 120,000	every 180,000	every 300,000	yearly	
Externals	Copyboard glass	△					
	Copyboard cover	△					
	Ozone filter	●				●	Or, 1 yr.
	Dust-proofing filter*				●		
Scanner drive assembly	Scanner drive cable (front/rear)	□					Use alcohol, and apply lubricant.
	Scanner rail		×			×	
Optical path	Scanning lamp		●				Use a blower brush. If the dirt is excessive, use alcohol.
	No. 1 to 6 mirrors	△					
	Dust-proofing glass	△					
	Scanner reflecting cover	△					
	Scanner side reflecting plate	△					
	Lens	△					
Developing assembly	Developing assembly roll	△					
	Developing cylinder			●			
Cleaner	Waste toner box						Replaced by the user in response to an alarm.
Pick-up assembly	Pick-up roller	△	●				
	Pick-up feed roller	△	●				
	Pick-up separation roller	△	●				
	Multifeeder pick-up roller	△	●				
	Multifeeder separation pad		●				
Feeding assembly	Transfer guide	△					
Fixing assembly	Fixing upper roller	△		●			
	Fixing lower roller	△		●			
	Separation claw (upper/lower)	△		●			Look for damage on the claw tip and for soiling by toner.
	Heat roller		●				
	Delivery roller			●			
	Fixing heater*				●		
Others	Transfer charging wire	●					
	Static eliminator	●					

*NP7210 only

B. Cassette Feeding Module

△: Clean ●: Replace ✕: Oil ☐: Adjust ◎: Overhaul

Unit Name	Item	Regular Service					Remarks
		Every 60,000 copies	Every 120,000 copies	Every 180,000 copies	Every 300,000 copies	Every year	
Pick-up Assembly	Pick-up Rollers	△	●				[1] in Figure 10-401
	Feed Rollers	△	●				[2] in Figure 10-401
	Separation Rollers	△	●				[3] in Figure 10-401

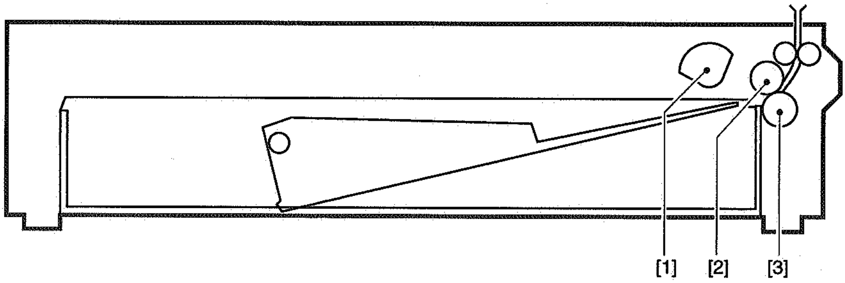

Figure 10-401

CHAPTER 11

TROUBLESHOOTING

This chapter provides tables of maintenance/inspection, standards/adjustments, and identification of problems (image fault/malfunction).

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  B. Points to Note for Scheduled Servicing . 11-4
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I. GUIDE TO TROUBLESHOOTING TABLES

The troubleshooting tables in this chapter are based on more commonly used troubleshooting flow charts.

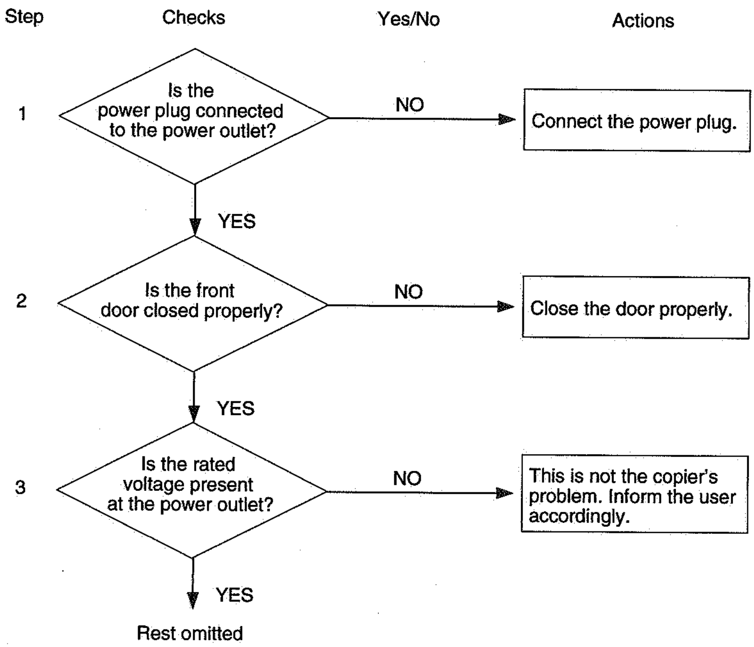
Study the following for an idea of how you may take advantage of the tables.

EX: AC power is absent.

Cause	Step	Checks	Yes/No	Actions
Power plug	1	Is the power plug connected to the power outlet?	NO	Connect the power plug.
Covers	2	Are the front door and delivery cover closed properly?	NO	Close the door and the cover properly.
Power source	3	Is the rated voltage present at the power outlet?	NO	This is not the copier's problem. Inform the user accordingly.
	4	Is the rated voltage present between J1-1 and J1-2? (J1 is found near the power cord mount.)	YES	Go to step 6.

Rest omitted.

- If you want to find out the possible causes (faulty parts) associated with a specific problem, see the items under "Cause."
  In the case of the above, i.e., "AC power is absent," you may suspect the power plug, doors and covers, or power source.
- If you want to find out the checks to make or the actions to take for a specific problem, follow the instructions under "Checks" and "Actions" in sequence. Answer the question Yes or No, and if your answer matches the answer given under "Yes/No," take the action given under "Actions"; otherwise, go to the next step and work likewise.


Step
Checks
Yes/No
Actions
1
Is the power plug connected to the power outlet?
NO
Connect the power plug.
YES
2
Is the front door closed properly?
NO
Close the door properly.
YES
3
Is the rated voltage present at the power outlet?
NO
This is not the copier's problem. Inform the user accordingly.
YES
Rest omitted

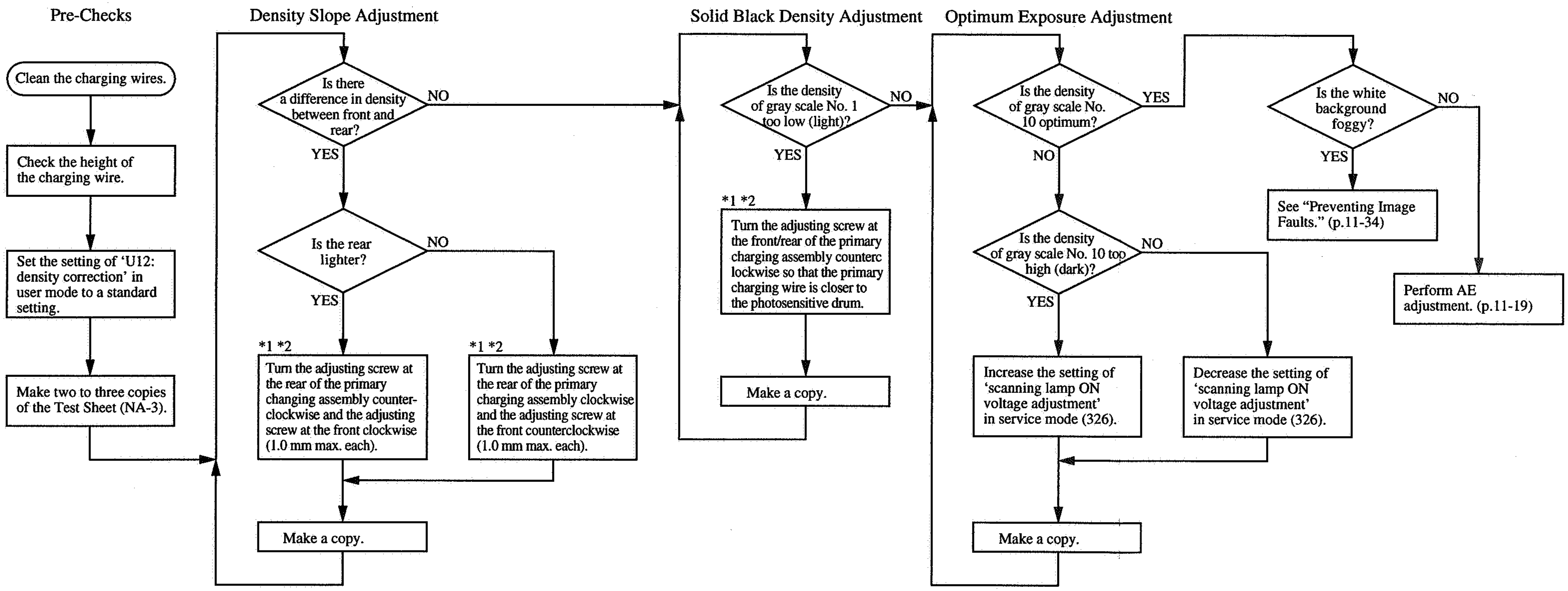
- The instruction “Measure the voltage between J109-1 (+) and J109-2 (-) on the DC controller PCB” means you are expected to make the following connections:

  Connect the positive probe of your meter to J109-1 (+), and

  Connect the negative probe of your meter to J109-2 (-).

A. Image Adjustment Basic Procedure

Non-AE, Copy Density at 5


Pre-Checks
Clean the charging wires.
Check the height of the charging wire.
Set the setting of 'U12: density correction' in user mode to a standard setting.
Make two to three copies of the Test Sheet (NA-3).
Density Slope Adjustment
Is there a difference in density between front and rear?
NO
YES
Is the rear lighter?
NO
YES
*1 *2
Turn the adjusting screw at the rear of the primary changing assembly counter-clockwise and the adjusting screw at the front clockwise (1.0 mm max. each).
*1 *2
Turn the adjusting screw at the rear of the primary charging assembly clockwise and the adjusting screw at the front counterclockwise (1.0 mm max. each).
Make a copy.
Solid Black Density Adjustment
Is the density of gray scale No. 1 too low (light)?
NO
YES
*1 *2
Turn the adjusting screw at the front/rear of the primary charging assembly counterclockwise so that the primary charging wire is closer to the photosensitive drum.
Make a copy.
Optimum Exposure Adjustment
Is the density of gray scale No. 10 optimum?
YES
NO
Is the density of gray scale No. 10 top high (dark)?
NO
YES
Increase the setting of 'scanning lamp ON voltage adjustment' in service mode (326).
Decrease the setting of 'scanning lamp ON voltage adjustment' in service mode (326).
Make a copy.
Is the white background foggy?
NO
YES
See "Preventing Image Faults." (p.11-34)
Perform AE adjustment. (p.11-19)

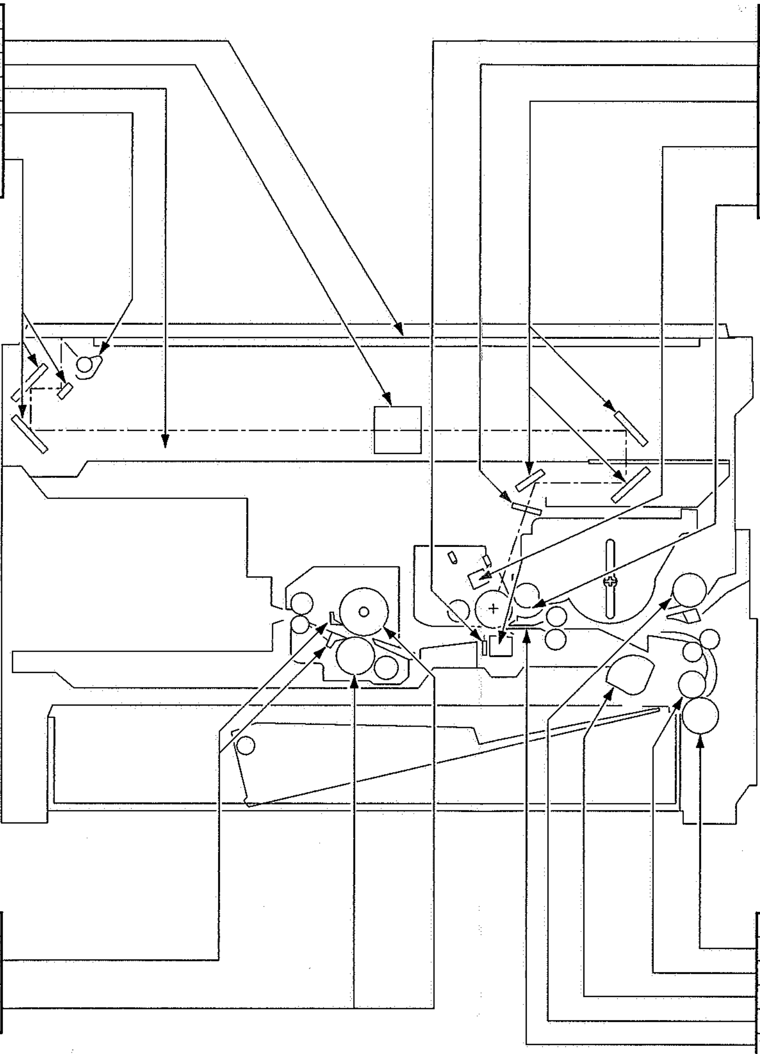
1: If there still is a difference after turning the adjusting screw 1.0 mm each, check the charging assembly, scanning lamp, and scanner for dirt.
*A full turn causes a change of 0.5 mm.

*2: When turning the adjusting screw clockwise, be careful that the height of the charging wire is not less than 10.0 mm.

B. Points to Note for Scheduled Servicing

Part	Tool/solvent	Remarks
Copyboard glass	Alcohol	Cleaning
Lens	Blower brush	Cleaning
Scanner rail	Lubricant	Lubricate
Reflecting plate	Blower brush	Cleaning
No. 1 to 3 mirrors	Blower brush; or, alcohol and lint-free paper	Cleaning with a blower brush; if excessive, cleaning with alcohol

Part	Tool/solvent	Remarks
Static eliminator	Brush (attachment)	Cleaning
Dust-proofing glass	Blower brush or alcohol and lint-free paper	Cleaning with a blower brush; if excessive, cleaning with alcohol.
No. 4 to 6 mirrors		
Charging wire	Alcohol and lint-free paper	Dry wiping; then, cleaning with lint-free paper moistened with alcohol
Developing roller		Cleaning



Part	Tool/solvent	Remarks
Separation claw (upper/lower)	Lubricant and lint-free paper	Cleaning
Fixing upper roller, Fixing lower roller	Lint-free paper	Dry wiping

Part	Tool/solvent	Remarks
Separation roller		Cleaning
Feed roller		
Pick-up roller		
Multifeeder pick-up roller		
Transfer guide	Moist cloth	Cleaning

Part	Tool/solvent	Remarks
Waste toner box		Checking/collecting

II. STANDARDS AND ADJUSTMENTS

A. Mechanical

1. Leading Edge Non-Image Width (blank exposure lamp off timing)

Select No. 306 in service mode.

Make adjustments so that non-image width on copies made of the Test Sheet in Direct is 2.0 ±1.0mm.

[unit: 0.21 mm] [settings: 0 to 500]

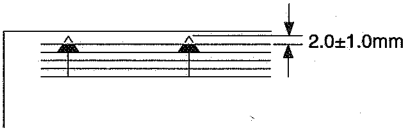


Figure 11-201

2. Image Leading Edge Margin (registration on timing)

Select No. 305 in service mode.

Make adjustments so that the image leading edge margin on copies made of the Test Sheet in Direct is 2.5 ±1.5 mm.

[unit: 0.21 mm] [settings: 0 to 500]

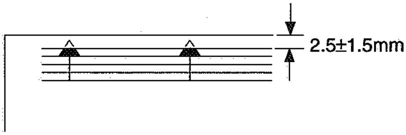


Figure 11-202

3. Left/Right Registration (cassette)

Make adjustments by moving the horizontal registration adjusting screw of the cassette so that the distance between the copy image and the copy paper is 0 ±2.0 mm on copies made of the Test Sheet in Direct.

Turn the adjusting screw [1] until the cassette locking lever plate [2] and the cassette locking lever [3] engage.

When the adjusting screw [1] is turned clockwise, the cassette locking plate moves to the front.

When the adjusting screw [1] is turned counterclockwise, the cassette locking lever plate [2] moves to the rear.

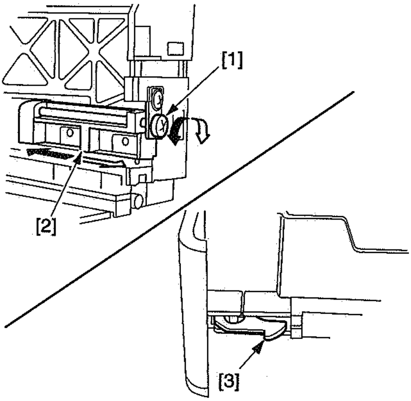


Figure 11-203

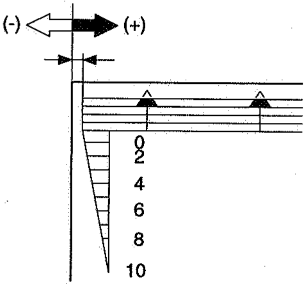


Figure 11-204

B. Exposure System

1. Routing the Scanner Drive Cable

Route the cable following steps [1] through [7], and perform the steps under "Adjusting the Tension of the Cable" and "Adjusting the Position of the Mirror."

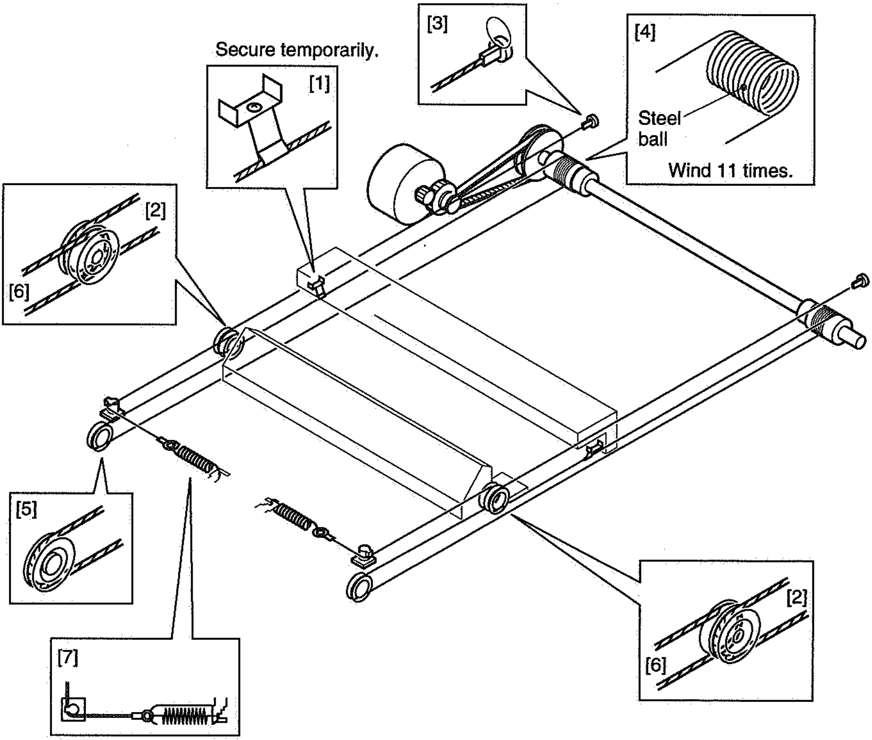

Secure temporarily.
[1]
[3]
[4]
Steel ball
Wind 11 times.
[2]
[6]
[5]
[7]
[2]
[6]

Figure 11-205

2. Adjusting the Position of the Mirror

Be sure to adjust the position of the mirror as follows after you have mounted the scanner drive cable.

1) Keep the mirror positioning tool nearby.
   Arrange the mirror positioning tool (FY9-3046-000) as shown to adapt it to the copier.

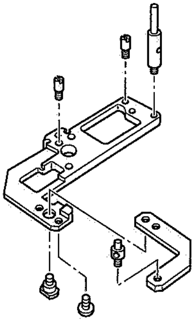


Figure 11-206a (Rear)

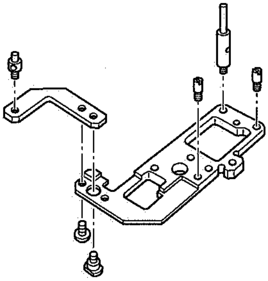


Figure 11-206b (Front)

2) Fit the mirror positioning tool [1] to the No. 1 mirror base and the No. 2 mirror base (both front and rear).
3) Tighten the mounting screw [2] on the cable metal fixing of the No. 1 mirror base (both front and rear).

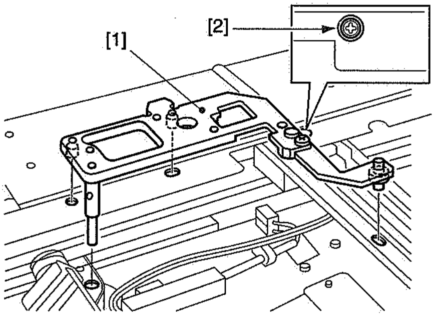


Figure 11-207a (Rear)

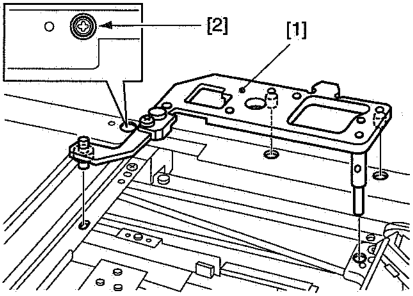


Figure 11-207b (Front)

4) Detach the mirror positioning tool.

3. Adjusting the Tension of the Scanner Drive Cable

Be sure to adjust the tension as follows after routing the scanner drive cable.

1) Move the scanner to home position.
2) Pull the center of the scanner drive cable with a spring gauge about 10 mm. At this time, adjust the position [A] of the tension spring [1] so that the reading of the spring gauge is 95 ±15 g.

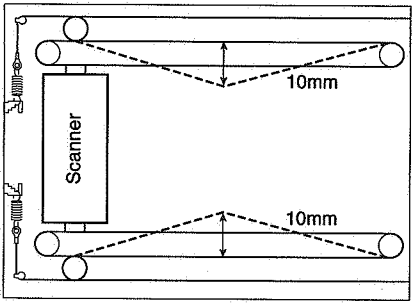


Figure 11-208

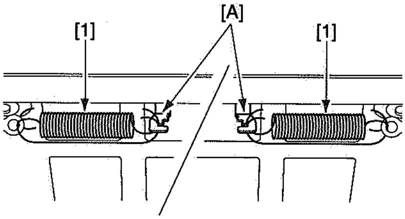


Figure 11-209

C. Image Formation System

1. Outline

As many as two charging wires are located around the photosensitive drum. (These charging wires are 0.06 mm in diameter.)

2. Stringing the Charging Wires

Basically, all charging wires are strung in the same way. (The following uses the primary charging wire as an example.)

1) Remove the mounting screw [1], and remove the stopper [2] and the grid plate [3].
   To remove the transfer charging assembly, remove the three hooks [a], and remove the guide wire plate [b].

- Primary Charging Assembly

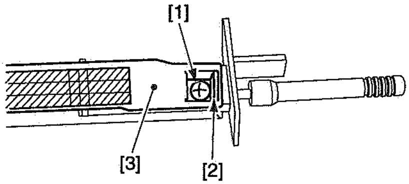


Figure 11-210a

- Transfer Charging Assembly

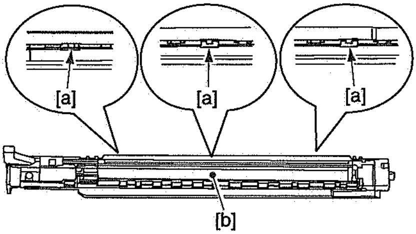


Figure 11-210b

2) Remove the sheet (front) [4] and the sheet (rear) [5].
   To remove the transfer charging assembly, remove the sheet (front) [c] and the sheet (rear) [d].

- Primary Charging Assembly

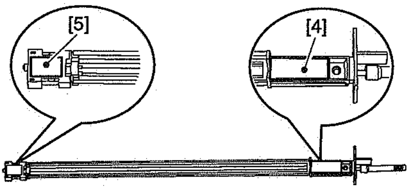


Figure 11-211a

- Transfer Charging Assembly

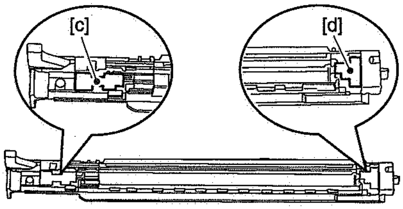


Figure 11-211b

3) Remove the spring [6], and remove the charging wire [7].
To remove the transfer charging assembly, remove the spring [e] and the cushioning rubber [f], and remove the charging wire [g].

- Primary Charging Assembly

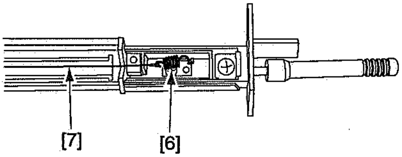


Figure11-212a

- Transfer Charging Assembly

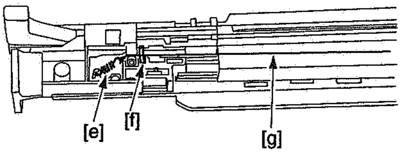


Figure 11-212b

4) Free a length of about 5 cm of charging wire (0.06-mm dia.) from the reel, and form a loop at the end (2-mm dia.).

Note:
To form a loop easily, wind the charging wire around a hex key once; then, turn the hex key three to four times, and twist the charging wire.

5) Cut the excess end of the twisted charging wire with a nipper.
6) Hook the loop on the charging electrode at the rear.

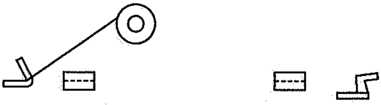


Figure 11-213

7) Hook the charging wire on the charging wire positioner at the rear; then, pull on the charging wire as indicated, and hook the charging wire tension spring on the charging wire by the distance A ; then, twist it.

A:
- Primary charging assembly : 13.0 ± 0.5 mm
- Transfer charging assembly : 12.0 ± 0.5 mm

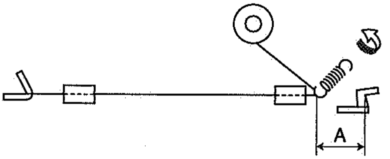


Figure 11-214

8) Cut the excess charging wire with a nipper.
9) Pick the end of the charging wire tensioning spring with tweezers, and hook it on the charging electrode.
   To install the transfer charging assembly, install the cushioning rubber.

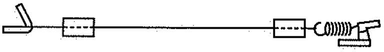


Figure 11-215

Note:

Go through the following:

- Be sure that the charging wire is free of bending and twisting, and its gold plating has not peeled.
- Be sure that the charging wire is in the V-groove of the charging wire positioner.

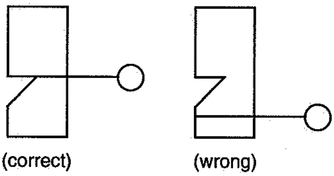


Figure 11-216

10) Wipe the charging wire with lint-free paper moistened with alcohol.

Caution:

- Do not use a cloth carrying metal powder for cleaning.
- Do not use a moist cloth for cleaning.
- Dry wipe with lint-free paper; then, mount only after making sure that alcohol has completely evaporated.

11) Mount the sheet (front) and the sheet (rear).
12) Mount the stopper and the grid plate.
    For the transfer charging assembly, mount the guide wire plate.

3. Adjusting the Height of the Charging Wires

To adjust each charging wire, turn its respective height adjusting screw. A full turn on the screw will change the height of the primary charging wire by about 0.5 mm and that of the transfer charging wire by about 0.7 mm.

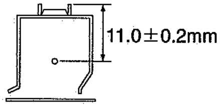
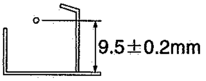
Charging assembly	Height of charging wire (mm)	Range
Primary	 11.0±0.2mm	±1.0mm
Transfer	 9.5±0.2mm	±1.0mm

Figure 11-217

- Primary Charging Assembly

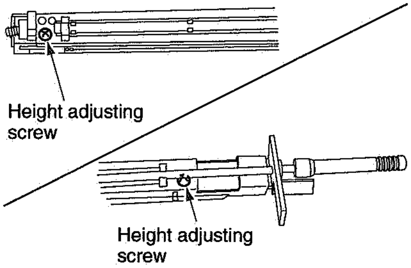

Height adjusting screw
Height adjusting screw

Figure 11-218a

- Transfer Charging Assembly

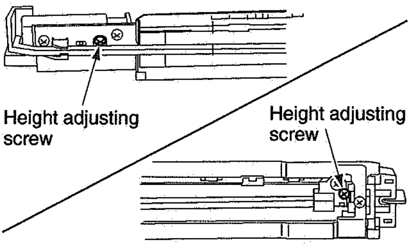

Height adjusting screw
Height adjusting screw

Figure 11-218b

D. Pick-Up/Feeding System

1. Adjusting the Pressure of the Separation Pad

If double feeding or pick-up failure occurs, loosen the adjusting screw [1] and relocate the holder [2] to adjust the force of the separation pad tension spring.

- If pick-up occurs, move the holder in the direction of [A].
- If double feeding failure occurs, move the holder to in the direction of [B].

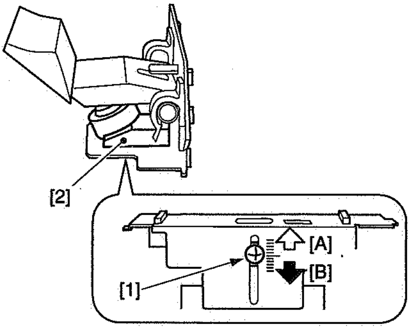


Figure 11-219

2. Changing the Cassette Size (AB/INCH)

1) Slide out the cassette.
2) Loosen the mounting screw [1] on the left side of the cassette; then, slide the size switching block [2] to the desired size position, and fix it in position.

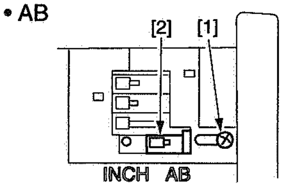


Figure 11-220a

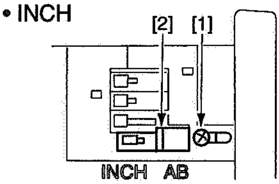


Figure 11-220b

3) Remove the mounting screw [3]; then, slide the size switching lever [4] to the desired size position, and fix it in place.

- AB

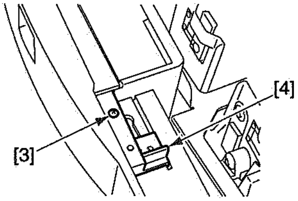


Figure 11-221a

- INCH

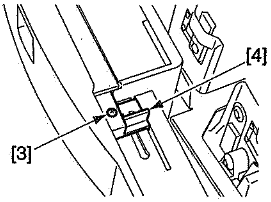


Figure 11-221b

4) Remove the mounting screw [5]; then, change the mount position of side guide block [6] to the desired size position, and fix it in place.

- AB

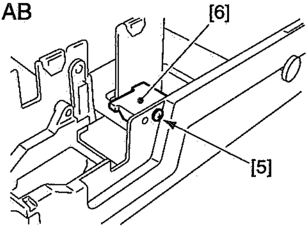


Figure 11-222a

- INCH

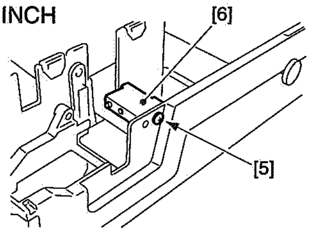


Figure 11-222b

E. Fixing System

1. Adjusting the Height of the Fixing Assembly Inlet Guide

1) Loosen the two adjusting screws [1], and adjust the height of the fixing assembly inlet guides [2].

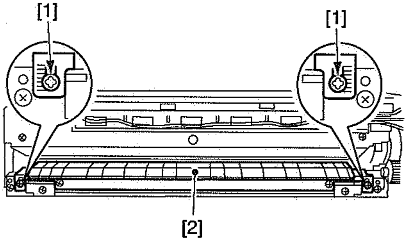


Figure 11-223

2. Adjusting the Pressure of the Lower Roller (nip)

If the nip is as indicated in Table 11-201, no adjustment is necessary.

If the nip is not as indicated, change the position of the pressure spring [1].

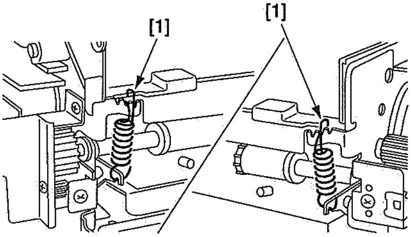


Figure 11-224

Caution:
a and c represent points 10 mm from both ends of copy paper.

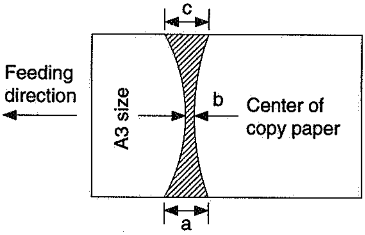


Figure 11-225

Dimensions	Measurements*
b	4.8 ± 0.3mm
l a - c l	0.5 mm or less

*Be sure both upper and lower rollers are sufficiently warm before taking measurements.

Table 11-201

a. Measuring the Nip

Before measuring the nip, wait for 15 min after the end of warm-up and make 20 A4 copies:

1) Open the copy board cover, and make a solid black copy on A3 copy paper.
2) Place the copy paper made at step 1) in the multifeeder, and select the multifeeder as the source of paper.
3) Execute nip measurement mode (service mode).
   - The above steps will deliver a measurement sheet like the one shown in Figure 11-225.

F. Electrical System

1. Obtaining Optimum Exposure

You can adjust the intensity of the scanning lamp (LA1) at F5 as follows (effective for both AE and manual):

1) Set the setting of 'U12' (density correction) in user mode to its initial value.
2) Place the Test Sheet (NA-3) on the copyboard, and select non-AE and Direct.
3) Select '216' (density adjusting volume voltage display) in service mode.
4) Slide the density adjusting volume until the copy count indicator indicates '245' as the F5 voltage.
5) Make a copy.
6) Check the copy image, and change the setting of '326' (scanning lamp on voltage adjustment) in service mode using the keypad.
   [1] A higher setting will increase the intensity, making the image lighter.
   [2] A lower setting will decrease the intensity, making the image darker.

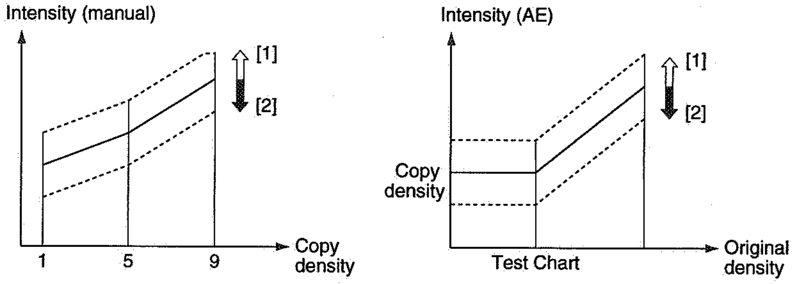


Figure 11-226

7) Press the Start key, and store the setting.
   - Repeat steps 5) through 7) until an optimum image is obtained.
8) Press the Reset key to end service mode.

2. AE Adjustment

If copies of a newspaper are foggy or if you have replaced the scanning lamp (LA1), AE sensor, or DC controller PCB, perform the following:

(Be sure that the image is an optimum image before starting the work.)

a. AE Auto Adjustment

1. AE Scanning Intensity Auto Adjustment

1) Select '301' (AE auto adjustment) in service mode.
2) Place the Test Chart (white background original) on the copyboard glass.
3) Press '0' of the keypad so that the copy count indicator indicates '0'.
4) Press the Start key.
   - The scanner moves to the AE scan position, stops, and performs AE exposure. Then, the scanner moves in reverse to home position. (15 sec from start of forward movement and the end of reverse movement)
   - The output of the AE sensor will be indicated in the copy count indicator. Check to make sure it is 80 ±5. If not, execute '302' (AE scanning intensity adjustment) in service mode.

2. AE Slope Auto Adjustment

5) Select '301' (AE auto adjustment) in service mode.
6) Place a newspaper on the copyboard glass.
7) Press '1' of the keyboard so that the copy count indicator indicates '1'.
8) Press the Start key.
   - The scanner moves to the AE scan position, stops, and performs AE exposure. Then, the scanner moves in reverse to home position. (15 sec from start of forward movement and the end of reverse movement)
   - The output of the AE sensor will be indicated in the copy count indicator. Check to make sure it is between 0 and 255. If not, execute '303' (AE slope adjustment) in service mode.
9) Press the Reset key to end service mode.

b. AE Scanning Intensity Adjustment

If an optimum image cannot be obtained by executing '301' (AE auto adjustment) in service mode, perform the following:

1) Place a white background original on the copyboard glass, and select AE and Direct.
2) Make a copy, and check the copy image.
3) Select '302' (AE scanning intensity adjustment) in service mode.
   - The copy count indicator will indicate the present setting.
4) Change the setting using the keypad or the +/- key.
   [1] A lower setting will increase the intensity, making the copy image lighter.
   [2] A higher setting will decrease the intensity, making the copy image darker.

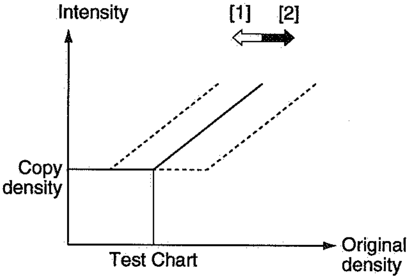


Figure 11-227

5) Press the Start key to store the new setting.
   - Repeat steps 2) through 5) until an optimum image is obtained.
6) Press the Reset key to end service mode.

c. AE Slope Adjustment

If an optimum image cannot be obtained by executing '301' (AE auto adjustment) in service mode, perform the following:

1) Place a newspaper on the copyboard glass, and select AE and Direct.
2) Make a copy, and check the copy image.
3) Select '303' (AE slope adjustment) in service mode.
   - The copy counter will indicate the present setting.
4) Change the setting using the keypad or +/- key.
   [1] A lower setting will increase the intensity, making the copy image lighter.
   [2] A higher setting will decrease the intensity, making the copy image darker.

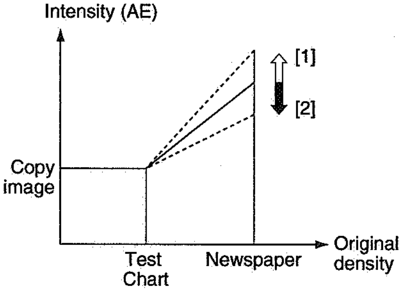


Figure 11-228

5) Press the Start key to store the new setting.
   - Repeat steps 2) through 5) until an optimum image is obtained.
6) Press the Reset key to end service mode.

3. After Replacing the DC Controller PCB

1) Set the DIP switch (SW102) on the new DC controller PCB so that its settings are the same as the old DC controller PCB.
2) Mount the new DC controller PCB.
3) Press the User Mode key, hold down '2' and '8' of the numeric keypad for 0.5 sec or more, and then press the User Mode key.
   - The copier starts service mode, and indicates '[1]' on the control panel.
4) Press '4' on the numeric keypad, and press the AE key.
   - The copier enters FUNCTION mode, and indicates '401' on the control panel.
5) Press '5' and '0' on the numeric keypad in sequence, and press the Start key.
   - The copier turns off once, and initializes the RAM (IC116).
6) Press '1' of the keypad and the Start key in sequence.
   - The power turns off, and the data in RAM (IC116) will be initialized.
7) Turn on the power, and selected the service mode.
8) Enter the settings of each service mode by referring to the service mode label kept behind the front door.
9) Press the Reset key to end service mode.

4. Checking the Photointerrupters

The copier allows you to use its service mode when checking its photointerrupters. (You may also use a conventional meter.)

a. Using a Meter
1) Put the copier in standby state.
2) Set the range of the meter to 30 VDC.
3) Connect the - probe of the meter to J105-5 (GND) of the DC controller PCB.
4) Connect the + probe of the meter to the appropriate terminal on the DC controller PCB indicated in the tables that follow.
5) Make checks as instructed.

b. Using Service Mode
1) Press the User Mode key.
2) Press '2' and '8' of the keypad at the same time. (Hold them down for 0.5 sec or more.)
3) Press the User Mode key once again.
   - The copier starts service mode, and indicates '1' on the copy count indicator.
4) Press '2' and then the AE in sequence.
   - The copier starts I/O DISPLAY mode, and indicates '201'.
5) Enter the appropriate service mode No. indicated in the tables that follow, and press the Start key.
6) Make checks as instructed.
   - Refer to the state of the copy count indicator LEDs. (Tables use '1' to indicate ON, and '0' to indicate OFF.)

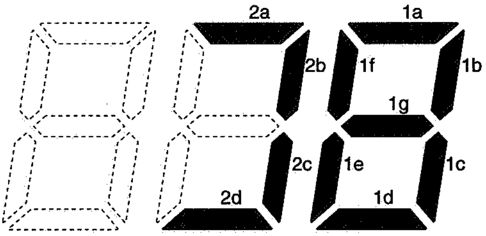


Figure 11-229

- Copier

Sensor	Connector	Checks		LED	Voltage
	Service mode				
PS1 Scanner home position sensor	J103-B2	In standby, move the scanner by hand.	When the light-blocking plate is at PS1,	1a=1	5V
	220		When the light-blocking plate is not at PS1,	1a=0	0V
PS2 Lens home position sensor	J103-B5	In standby, move the lens by hand.	When the light-blocking plate is at PS2,	1c=1	5V
	219		When the light-blocking plate is not at PS2,	1c=0	0V
PS3 Mirror home position sensor	J103-B8	In standby, move the No. 4/No. 5 mirror by hand.	When the light-blocking plate is at PS3,	1b=1	5V
	219		When the light-blocking plate is not at PS3,	1b=0	0V
PS4 Cassette paper sensor	J107-B12	In standby, move the detecting lever by hand.	When the light-blocking plate is PS4,	1b=1	5V
	202		When the light-blocking plate is not at PS4,	1b=0	0V
PS5 Registration paper sensor	J107-A2	In standby, move the detecting lever by hand.	When the light-blocking plate is at PS5,	1g=1	5V
	222		When the light-blocking plate is not at PS5,	1g=0	0V
PS6 Delivery paper sensor	J124-2	In standby, move the detecting lever by hand.	When the light-blocking plate is at PS6,	1f=1	5V
	222		When the light-blocking plate is not at PS6,	1f=0	0V
PS7 Multi paper sensor	J107-A8	In standby, move the detection lever by hand.	When the light-blocking plate is at PS7,	2b=1	5V
	202		When the light-blocking plate is not at PS7,	2b=0	0V
PS8 Waste toner feeding screw locked sensor	J106-10	In standby, move the detecting lever by hand.	When the light-blocking plate is at PS8,	1f=1	5V
	223		When the light-blocking plate is not at PS8,	1f=0	0V
PS9 Multi wide sensor 1	J107-A11	In standby, move the slide guide by hand.	When the light-blocking plate is at PS9,	2c=1	5V
	202		When the light-blocking plate is not at PS9,	2c=0	0V
PS10 Multi wide sensor 2	J107-A14	In standby, move the slide guide by hand.	When the light-blocking plate is at PS10,	2d=1	5V
	202		When the light-blocking plate is not at PS10,	2d=0	0V

Sensor	Connector	Checks		LED	Voltage
	Service mode				
PS11 Right door open sensor	J107-B7	In standby, open the right door.	When the light-blocking plate is at PS11,	1d=1	5V
	202		When the light-blocking plate is not at PS11,	1d=0	0V
PS12* Copyboard cover open/ close sensor	J125-2	In standby, move the detecting lever by hand.	When the light-blocking plate is at PS12,	1g=1	5V
	223		When the light-blocking plate is not at PS12,	1g=0	0V
PS13* Vertical path paper sensor	J107-15	In standby, move the detecting lever by hand.	When the light-blocking plate is at PS13,	1e=1	5V
	202		When the light-blocking plate is not at PS13,	1e=0	0V
Waste toner sensor	J106-9	In standby, remove the waste toner box.	When the light-blocking plate is at sensor,	1a=1	5V
	222		When the light-blocking plate is not at sensor,	1a=0	0V

*NP7210 only

- Cassette feeding module

Sensor	Connector	Checks		LED	Voltage
	Service mode				
PS101 Cassette paper sensor	J122-B5	In standby, move the detecting lever by hand.	When the light-blocking plate is at PS101,	1b=1	5V
	203		When the light-blocking plate is not at PS101,	1b=0	0V
PS102 Vertical path paper sensor	J122-A10	In standby, move the detecting lever by hand.	When the light-blocking plate is at PS102,	1f=1	5V
	202		When the light-blocking plate is not at PS102,	1f=0	0V
PS103 Door open sensor	J122-A8	In standby, move the detecting lever by hand.	When the light-blocking plate is at PS103,	1a=1	5V
	203		When the light-blocking plate is not at PS103,	1a=0	0V
PS104 Swing cam home position sensor	J122-B1	In standby, move the detecting lever by hand.	When the light-blocking plate is at PS104,	2a=1	5V
	222		When the light-blocking plate is not at PS104,	2a=0	0V

III. IMAGE FAULTS

A. Initial Checks

1. Checking the Site Environment

a. The power outlet must be exclusive, and must provide the rated voltage. (The power plug must remain connected throughout day and night.)

b. The copier must not be installed in a high-temperature/-humidity environment (near a water faucet, water boiler, humidifier), near a source of fire, or in a dusty area.

c. The copier must not be subjected to ammonium gas.

d. The copier must be kept away from direct sunshine. As necessary, provide curtains.

e. The site must be well ventilated.

f. The copier must be kept level.

g. The copier must remain powered throughout day and night.

Check to make sure that all above conditions are met.

2. Checking the Originals

Identify the problem as to its cause—original page or the copier.

a. As a rule, the Copy Density adjusting lever must be at the median graduations, and 'U12: density correction' in user mode must be set to '0'.

b. Original pages with a reddish background can cause poor contrast.

EX. Slips (invoices) made on reddish paper.

c. Diazo copies and original pages with a high transparency can produce copies mistakenly identified as "foggy" copies. Original pages prepared in light pencil, on the other hand, can produce copies mistakenly identified as "light" copies.

3. Checking the Copyboard Cover and Copyboard Glass

If soiled, clean it using a solution of mild detergent or alcohol. If scratches are found, replace it.

4. Checking the Charging Assembly

a. Check each charging assembly for soiling and a fault on its charging wire (scratches).

b. Clean the charging wire and shield plate of each charging assembly. (If dirt cannot be removed, replace it.)

c. Check the height of each charging wire.

d. Check to make sure that each charging wire is not rusted.

f. Check to make sure that the anti-vibration rubber (of each charging assembly) is not displaced.

5. Checking the Developing Assembly

a. Check to make sure that the rollers on both ends of the developing assembly are in contact with the drum.

b. Check to make sure that the surface of the developing cylinder is coated with an even layer of toner.

6. Checking the Paper

a. Check if the paper is of a type recommended by Canon.

b. Check if the paper is not moist.

Try using paper fresh out of package.

7. Checking the Periodically Replaced Parts

Replace those parts that have reached their service life as indicated in the Scheduled Servicing Chart and the Periodically Replaced Parts Table.

8. Others

Keep in mind that bringing in a copier from a cold to warm room, as during installation in winter, can cause condensation in its inside, causing various problems.

a. Condensation on the scanning system (glass, mirror, lens, etc.) can cause light images.

b. Condensation in the charging system can cause electric leakage.

c. Condensation on the pick-up/feeding guide plate can cause faulty feeding.

If condensation is noted, dry wipe the part or leave the copier powered for about one hour.

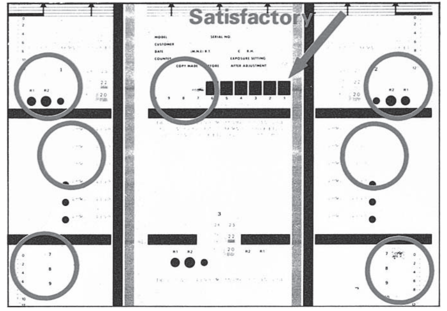
Caution:

If a discrepancy in density (between separation side and rear), light image, of fogging occurs, try to correct the problem by following the "Image Adjustment Basic Procedure."

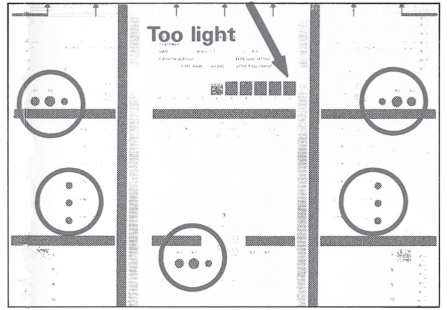
B. Image Faults Samples

Note: The samples are made artificially to provide an idea of faulty copies, and may not represent actual faults.
(The NA-3 Test Sheet was copied in DIRECT mode on A4 paper, and reduced for printing.)

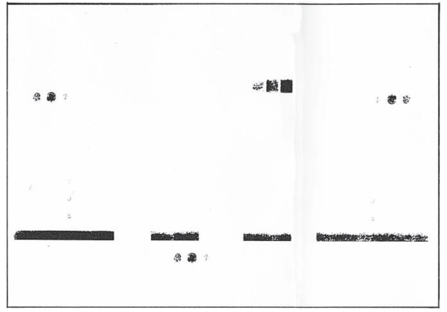
1. The copy is too light (halftone only).



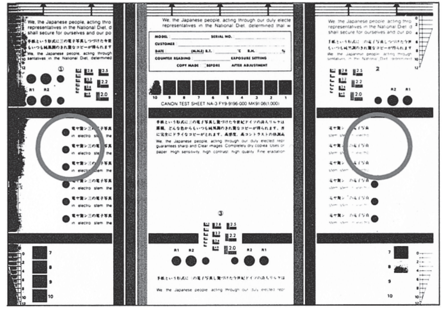
2. The copy is too light (both halftone and solid black).



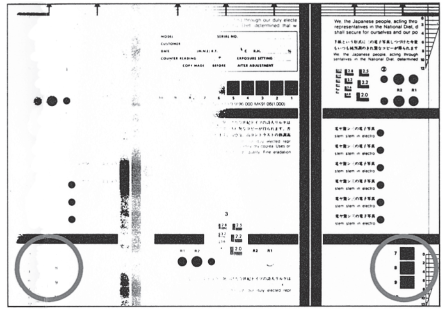
3. The copy is too light (entire copy, appreciably).



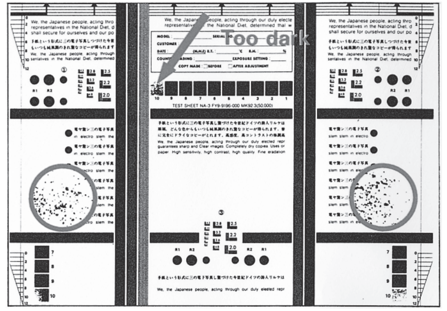
4. The copy has uneven density (darker along front).



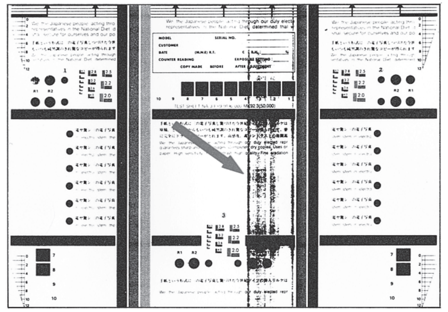
5. The copy has uneven density (lighter along front).



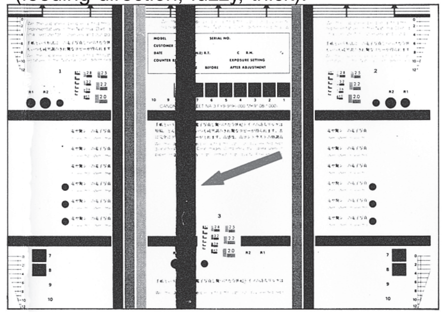
6. The copy is foggy (entire copy).



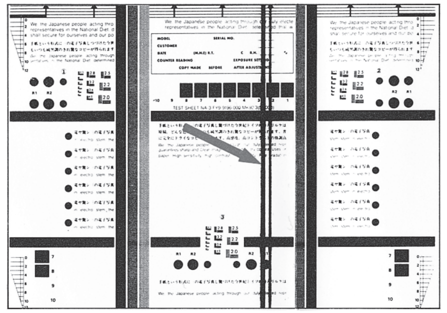
7. The copy is foggy (feeding direction).



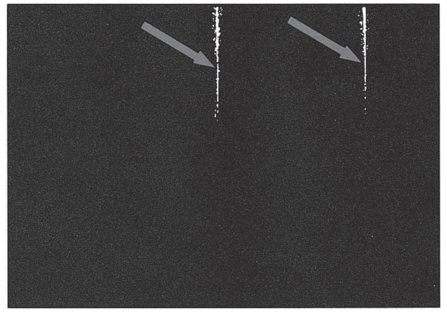
8. The copy has black lines (feeding direction, fuzzy, thick).



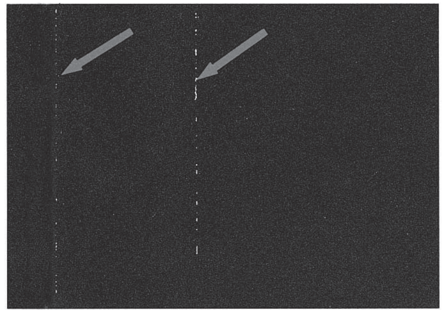
9. The copy has black lines (feeding direction, fine).



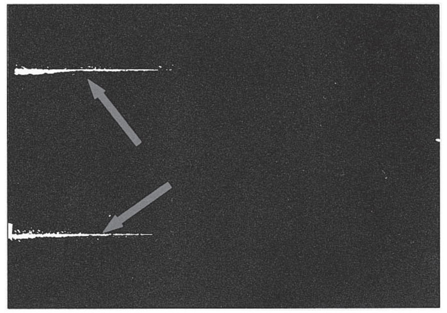
10. The copy has white strips (feeding direction).†



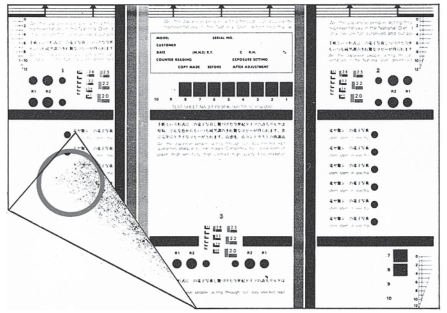
11. The copy has white lines (feeding direction).*



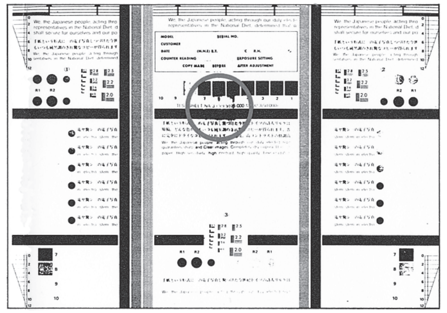
12. The copy has white strips (cross-feeding direction).



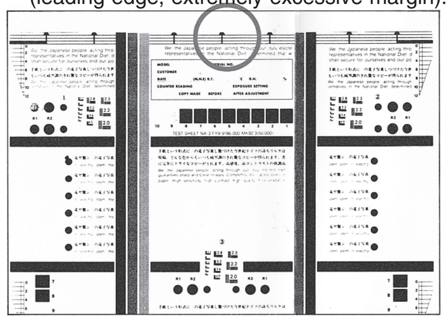
13. The back of the copy is soiled.



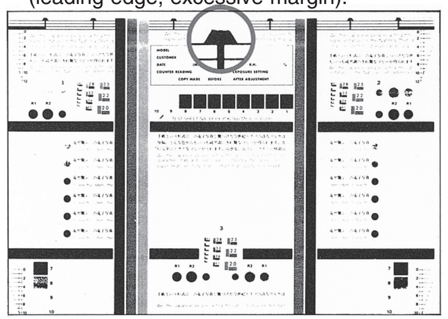
14. The copy has poor fixing.



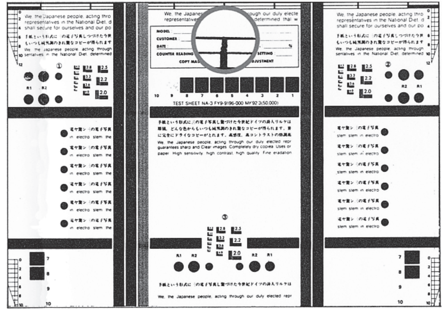
15. The copy has displaced registration (leading edge, extremely excessive margin).



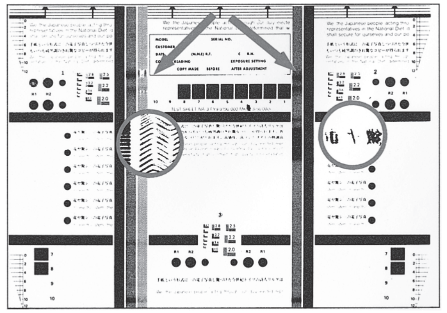
16. The copy has displaced registration (leading edge, excessive margin).



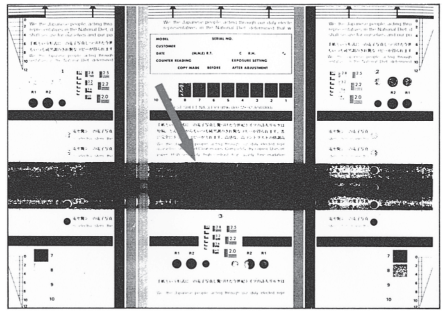
17. The copy has displaced registration (leading edge, no margin).



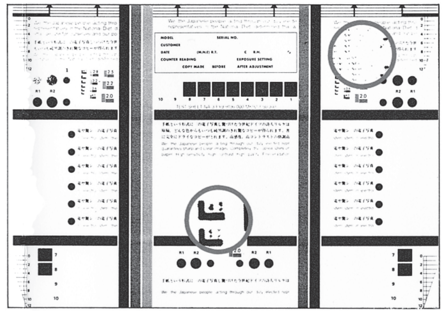
18. The copy has blurred images.



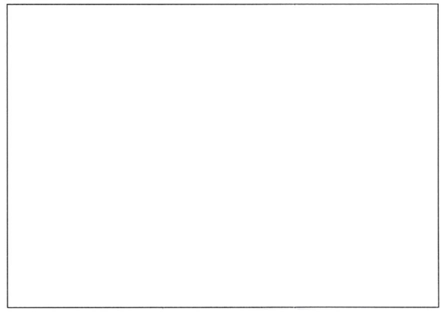
19. The copy is foggy (cross-feeding direction).



20. The copy has poor sharpness.



21. The copy is blank.



22. The copy is solid black.

* Copies made with the copyboard lifted; faults may also appear on normally made copies.
† Strips may vary in width.

C. Troubleshooting Image Faults

1. The copy is too light. (halftone area only)

Cause	Step	Checks	Yes/No	Actions
	1	Perform the Image Adjustment Basic Procedure. Is the problem corrected?	YES	End.
Scanner	2	Clean the mirror, lens, and dust-proofing glass. Is the problem corrected?	YES	End.
Developing assembly	3	Are the rollers of the developing assembly in firm contact with the drum during copying operation?	NO	Check the developing assembly locking lever.
Developing assembly	4	Is the coating of toner on the developing cylinder even?	NO	Check the developing assembly.
Lamp regulator PCB	5	Replace the lamp regulator PCB. Is the problem corrected?	YES	End.
DC controller PCB			NO	Replace the DC controller PCB.

2. The copy is too light. (including solid black area)

3. The copy is too light. (entirely, considerably)

Cause		Step	Checks	Yes/No	Actions
		1	Perform the Image Adjustment Basic Procedure. Is the problem corrected?	YES	End.
		2	Turn off the power switch in the middle of copying operation. Then, open the front door, and open the top unit. Is the toner image on the photosensitive drum before transfer more or less normal?	NO	Go to step 7.
Transfer	Transfer charging assembly	3	Is the charging wire of the transfer charging assembly hooked correctly? Are its height and position normal?	NO	1. Hook the charging wire correctly. 2. Adjust the height of the charging wire.
		4	Is the transfer charging assembly set securely?	NO	1. Clean the charging wire. 2. Set the charging assembly securely.
	Copy paper	5	Try paper fresh out of package. Is the problem corrected?	YES	1. The paper may be moist. Instruct the user on the correct method of storing copy paper. 2. Inform the user that the use of paper of a type not recommended by Canon may not always bring about good results.
	Lower transfer guide/varistor	6	Measure the resistance between the lower transfer guide and the metal portion of the feeding assembly. Is it 0 Ω?	YES	1. Check to make sure that the transfer guide is not in contact with the metal area of the feeding assembly (e.g., side plate). 2. Replace the varistor.
	High-voltage cord, DC controller PCB			NO	1. Check the continuity of the high-voltage cord. 2. Check the high-voltage power supply (primary/transfer) and the DC controller PCB.
Development	Developing assembly	7	Is the developing assembly set securely? Are the rolls of the developing assembly firmly in contact with the photosensitive drum?	NO	Check the developing assembly locking lever.
	Toner sensor (TS1)	8	Is toner in the developing assembly?	NO	Check the tone sensor. Then, supply toner.
	Photosensitive drum	9	Replace the drum unit. Is the problem corrected?	YES	End.
	Developing bias control			NO	Check the control system of the developing bias.

4. The copy has uneven density. (front side dark)
5. The copy has uneven density. (front side light)

Cause	Step	Checks	Yes/No	Actions
	1	Perform the Image Adjustment Basic Procedure. Is the problem corrected?	YES	End.
Developing assembly	2	Are the developing rolls of the developing assembly in firm contact with the photosensitive drum?	NO	Check the developing assembly locking lever.
Scanner	3	Clean the scanning lamp, reflecting plate, side reflecting plate, mirror, lens, and dust-proofing glass. Is the problem corrected?	YES	End.
Pre-scanning lamp (LA2)	4	Does the pre-exposure lamp remain on during copying?	NO	1. Replace the pre-exposure lamp. 2. Replace the DC controller PCB.
Developing assembly	5	Is the developing cylinder coated with a uniform layer of toner?	NO	1. Clean the tip of the blade of the developing assembly. (dry wiping)? 2. Clean the surface of the developing cylinder. 3. Check to make sure that the toner inside the developing assembly is not displaced to one side.
Charging assembly, Copy paper			YES	1. Clean all charging wires once again, and check the height of the charging wires once again. 2. Try replacing the copy paper.

6. The copy is foggy. (overall)

Cause	Step	Checks	Yes/No	Actions
	1	Perform the Image Adjustment Basic Procedure. Is the problem corrected?	YES	End.
Scanner	2	Clean the scanning lamp, reflecting plate, side reflecting plate, mirror, lens, and dust-proofing glass. Is the problem corrected?	YES	End.
Pre-exposure lamp (LA2), DC controller PCB	3	Does the pre-exposure lamp remain on during copying?	NO	1. Replace the pre-exposure lamp. 2. Replace the DC controller PCB.
Developing roll	4	Are the developing rolls worn?	YES	Replace the developing rolls.
Developing cylinder	5	Is the developing cylinder worn?	YES	Replace the developing cylinder.
Scanner lamp (LA1)	6	Replace the scanning lamp. Is the problem corrected?	YES	End.
High-voltage power supply PCB	7	Replace the high-voltage power supply PCB. Is the problem corrected?	YES	End.
Lamp regulator PCB	8	Replace the lamp regulator PCB. Is the problem corrected?	YES	End.
DC controller PCB			NO	Replace the DC controller PCB.

7. The copy is foggy. (vertical)
8. The copy has black lines. (vertical, fuzzy, thick)

Cause	Step	Checks	Yes/No	Actions
Primary charging assembly	1	Clean the primary charging wire, grid plate, and shielding plate. Is the problem corrected?	YES	End.
Scanner	2	Clean the scanning lamp, reflecting plate, side reflecting plate, mirror, lens, and dust-proofing glass. Is the problem corrected?	YES	End.
Pre-exposure lamp (LA2)	3	Clean the pre-exposure lamp. Is the problem corrected?	YES	End.
Developing assembly	4	Is the developing cylinder coated with a uniform layer of toner?	NO	Check and clean the edge of the blade of the developing assembly.
Fixing assembly			YES	Check the fixing assembly.

9. The copy has black lines. (vertical, thin)

Cause	Step	Checks	Yes/No	Actions
	1	Press the Copy Start key, and turn off the power switch while the copy paper is in the feeding assembly. At this time, does the copy image before it goes through the fixing assembly have black lines?	NO	Go to step 4.
Transfer guide	2	Is the transfer guide soiled (particularly the transfer upper guide)?	YES	Clean the transfer guide.
Photosensitive drum	3	Are there scratches or black lines in the peripheral direction of the surface of the photosensitive drum?	YES	Replace the drum unit. If scratches are found, be sure to find out the cause.
Developing system, Exposure system			NO	Check the developing system and the exposure system.
Fixing assembly	4	Are there scratches or black lines in the peripheral direction of the surface of the fixing upper roller?	YES	1. Replace the upper roller. 2. Check the separation claw.
			NO	Check to make sure that the fixing assembly inlet is not soiled.

10. The copy has white spots. (vertical)
11. The copy has white lines. (vertical)

Cause	Step	Checks	Yes/No	Actions
Fixing assembly	1	Press the Copy Start key with the copyboard cover open, and turn off the power switch while the copy paper is moving through the feeding assembly. At this time, does the copy image before it goes through the fixing assembly have white spots or lines?	NO	1. Clean the fixing assembly inlet guide. 2. Check the upper fixing roller. 3. Clean the separation claw.
Primary charging assembly	2	Clean the primary charging wire, grid plate, and shield plate. Is the problem corrected?	YES	Clean the part thoroughly with alcohol. If the dirt cannot be removed, remove the charging wire.
Developing assembly	3	Is the developing cylinder coated with an even layer of toner?	NO	Check the edge of the blade of the developing assembly for paper lint.
Copy paper	4	Try copy paper fresh out of package. Is the problem corrected?	YES	The copy paper is moist. Instruct the user on the correct method of storing copy paper.
Photosensitive drum	5	Are there scratches in the peripheral direction corresponding to the developing image?	YES	Replace the drum unit. If scratches are found, be sure to identify the cause.
Blank exposure lamp (LA3), DC controller PCB	6	Is the blank exposure lamp LED corresponding to the white spot or line on the copy on while the scanner is moving forward?	YES	Check the wiring from the blank exposure lamp to the DC controller PCB: if normal, replace the DC controller PCB.
External light			NO	Check to make sure that the photosensitive drum is free of external light.
Transfer charging assembly	7	Clean the transfer charging wire and the shield plate. Is the problem corrected?	YES	End.
Separation static eliminator	8	Clean the separation static eliminator. Is the problem corrected?	YES	End.

12. The copy has white spots. (vertical)

Cause	Step	Checks	Yes/No	Actions
Developing assembly	1	Is the problem noted at intervals of about 3.2 cm? (scratch on the developing cylinder)	YES	1. Clean the developing roller. 2. Clean the surface of the developing cylinder. 3. If scratches are found on the surface of the developing cylinder, replace the developing cylinder or the developing assembly.
Photosensitive drum	2	Is the problem noted at intervals of about 9.4 cm? (scratch on the photosensitive drum)	YES	1. Clean the photosensitive drum. 2. If the scratches are found on the photosensitive drum, replace the drum unit.
Copy paper	3	Try copy paper fresh out of package. Is the problem corrected?	YES	The copy paper is moist. Instruct the user on the correct method of storing copy paper.
Scanner rail, Scanner cable	4	Is the problem noted at the same location on all copies?	YES	1. Check the scanner rail for a foreign object. 2. Adjust the tension of the scanner cable.
Charging wire			NO	Clean each charging wire.

13. The back of the copy is soiled.

Cause	Step	Checks	Yes/No	Actions
	1	Turn off the power switch while the copy paper is moving through the feeding assembly. At this time, is the back of the copy paper soiled?	NO	Go to step 3.
Developing assembly	2	Is the problem noted at intervals of about 5 cm?	YES	1. Clean the registration roller. 2. Clean the transfer guide. 3. Check the developing assembly for leakage of toner.
Drum cleaner assembly			NO	1. Clean the feeding assembly. 2. Check the drum cleaner assembly for leakage of toner.
Fixing assembly	3	Is the fixing roller (upper, lower) soiled with toner?	YES	1. Clean the fixing roller (upper, lower). 2. Check to make sure that the toner adhering to the heat discharging roller is not soiling the fixing roller. If so, replace the heat discharging roller. 3. Clean the fixing assembly inlet guide.
Delivery assembly			NO	Clean the delivery roller and the separation claw.

14. The copy has faulty fixing.

Cause	Step	Checks	Yes/No	Actions
Fixing roller (upper/ lower)	1	Is the problem noted vertically?	YES	Check the fixing roller (upper, lower) for scratches.
Fixing heater (H1)	2	Does the fixing heater (H1) turn on immediately after power-on?	NO	See the "Fixing heater fails to turn on."
Fixing lower heater pressure	3	Is the nip of the fixing assembly as indicated?	NO	Adjust the fixing lower roller pressure.
Copy paper			YES	Try recommended paper. If the results are good, advise the user to use recommended paper.

15.
16. The copy has a displaced leading edge.
17.

Cause	Step	Checks	Yes/No	Actions
Original page	1	Is the original page placed correctly?	NO	Place the original page correctly.
Copy paper	2	Is the paper of a type recommended by Canon?	NO	Try recommended paper. If the results are good, advise the user to use recommended paper.
	3	Make copies using the cassette and the multifeeder tray? Is the displacement on the leading edge the same regardless of the source of paper?	YES	If the results are the same, go to step 4.
			NO	Check each pick-up system.
Pick-up roller	4	Has the pick-up roller reached its life?	YES	If wear is noted on the pick-up roller, replace it.
Leading edge margin	5	Adjust the leading edge margin. Is the problem corrected?	YES	End.
Registration clutch (CL1), Registration roller	6	Set the meter range to 30 VDC, and measure the voltage between J211-7 (+) and J211-6 (-) on the power supply PCB. Does it change from 0 to 24 V while the scanner is moving forward?	YES	1. Replace the registration clutch. 2. Check the registration roller for deformation and wear.
DC controller PCB			NO	Check the wiring from J106 on the DC controller PCB to CL1; if normal, replace the DC controller PCB.

18. The copy has a blurred image.

Cause	Step	Checks	Yes/No	Actions
Scanner cable	1	Does the cable wind on the cable pulley in layers while the scanner is moving?	YES	1. Route the cable once again. 2. If the cable is twisted or frayed, replace it.
Scanner rail	2	Move the No. 1 mirror mount slowly by hand. Does it move smoothly?	NO	Clean the surface of the scanner rail with alcohol. Then, apply a small amount of lubricant.
Photosensitive drum	3	Is the problem noted at intervals of about 9.4 cm?	YES	1. Check the drum gear. 2. Check the end of the drum (in contact with the developing roller) for scratches and protrusions.
Developing gear	4	Is the problem noted at intervals of about 3.2 cm?	YES	Check the developing assembly.
Drum drive system			NO	Check the drum drive system.

19. The copy is foggy. (horizontally)

Cause	Step	Checks	Yes/No	Actions
	1	Is the problem noted at the same location on all copies made in Direct?	YES	Go to step 4.
Scanning lamp (LA1), Lamp regulator PCB	2	Does the scanning lamp flicker when the scanner is moving forward?	YES	Check the scanning lamp and the lamp regulator PCB.
Developing roller	3	Is the developing roller soiled with toner, is the roller deformed, or is the area in contact with the developing roller (photosensitive drum) soiled with toner?	YES	Clean or, if necessary, replace the developing roller.
Developing bias	4	Is the developing bias applied correctly?	NO	Remove the developing assembly, and check the wiring; then, set it once again.
Scanner	5	Make a copy in Reduce, and compare it with a copy made in Direct. Is the problem noted in a different location?	YES	Check the scanning system.
Feeding assembly			NO	Check the feeding assembly.

20. The copy has poor sharpness.

Cause	Step	Checks	Yes/No	Actions
Copyboard glass	1	Is the copyboard glass soiled with oil or the like?	YES	Clean the copyboard glass.
Mirror	2	Is the horizontal reproduction ratio in Direct as indicated?	NO	Adjust the distance between the No. 1 mirror and the No. 2 mirror.
Scanner	3	Clean the scanning lamp, reflecting plate, mirror, lens, and dust-proofing glass. Is the problem corrected?	YES	End.
Lens drive assembly, No. 4/No. 5 mirror drive assembly	4	Is there dirt or foreign object in the path of the lens and the No. 4/ No. 5 mirror? Does the part, when pushed by hand, move smoothly?	YES	Remove the dirt and foreign object. As necessary, clean and lubricate.
Photosensitive drum			NO	Replace the drum unit.

21. The copy is blank.

Cause	Step	Checks	Yes/No	Actions
Drum unit	1	Is the drum unit set securely?	NO	Remove and set the drum unit once again.
Developing assembly	2	Is the developing assembly set securely?	NO	Remove and set the developing assembly securely.
Primary charging assembly	3	Is the primary charging wire broken?	YES	Spring the charging wire.
Developing assembly	4	Is the developing assembly locked to the drum?	NO	Check the developing assembly locking lever.
DC controller PCB	5	Does the blank exposure lamp remain off while the scanner is moving forward?	NO	Check the DC controller PCB.
Scanning lamp (LA1)	6	Does the scanning lamp remain on during copying operation?	NO	Make checks as instructed under "The scanning lamp fails to turn on."
Connector	7	Are the connectors on each PCB connected securely?	NO	Connect the connectors securely.
High-voltage cord	8	Is there continuity between high-voltage cords connected to each charging assembly?	NO	Replace the high-voltage cord.
High-voltage power supply (primary/transfer)			YES	Check the high-voltage power supply (primary/transfer).

22. The copy is solid black.

Cause	Step	Checks	Yes/No	Actions
	1	Does the scanning lamp remain on during copying operation?	NO	Make checks according to the instructions under "The scanning lamp fails to turns off."

IV. TROUBLESHOOTING MALFUNCTIONS

A. Copier

1. E000

Cause	Step	Checks	Yes/No	Actions
	1	Execute service mode '412' (error clear) to clear E000. Open the front door and the top unit, and let the fixing roller cool sufficiently. Turn off the power switch, and disconnect and then connect the power plug. Turn on the power switch. Does the fixing heater turn on? **Caution:** Do not repeat the steps without cooling the fixing roller sufficiently, or abnormal increase in the fixing temperature will damage the fixing roller and the separation claw.	NO	See "The Fixing heater fails to turn on."
Main thermistor (TH1)	2	Turn off the power switch, and let the fixing roller cool sufficiently. Turn on the power switch, and select service mode '109' (fixing main thermistor detection temperature display). Does the reading remain unchanged at '109'? (After the check, be sure to turn off the power switch.)	YES	Check the wiring on the DC controller PCB to the thermistor; if normal, replace the thermistor.
Sub thermistor (TH2)	3	Turn off the power switch, and let the fixing roller cool sufficiently. Turn on the power switch, and select service mode '110' (fixing sub thermistor detection temperature display). Does the reading remain unchanged at '110'? (After the check, be sure to tun off the power switch.)	YES	Check the wiring from J109 on the DC controller PCB to the thermistor; if normal, replace the thermistor.
Thermistor (TH1, TH2)	4	Is the thermistor in even contact with the upper fixing assembly?	NO	Mount the thermistor correctly.
Thermistor (TH1, TH2)	5	Clean the area of contact of the thermistor. Is the problem corrected?	YES	End.
Operating environment	6	Is the operating environment as specified?	NO	• Inform the user that the operating environment does not meet the requirements. • Instruct the user not to turn on the copier before the room is warm enough.
DC controller PCB			YES	Replace the DC controller.

2. E001

Cause	Step	Checks	Yes/No	Actions
	1	Execute service mode '412' (error clear) to clear E001. Open the front door and the top unit, and let the fixing roller cool sufficiently. Turn on the power switch. Is E001 indicated immediately after power-on?	NO	Go to step 3.
Thermistor (TH1, TH2)	2	Turn off the power switch, and disconnect J108 and J109 on the DC controller PCB. Connect the probes to J108-2 and J108-3 and then J109-1 and J109-2 on the harness side. Is the resistance about 0 Ω? (After the check, be sure to connect J108 and J109.)	YES	Replace the thermistor.
DC controller PCB			NO	Replace the DC controller PCB.
Triac	3	Replace the power supply PCB. Is the problem corrected?	YES	End.
DC controller PCB			NO	Check the wiring from the power supply PCB to the DC controller PCB; if normal, replace the DC controller PCB.

3. E002/E003

Cause	Step	Checks	Yes/No	Actions
	1	Execute service mode '412' (error clear) to clear E002 or E003. Open the front door and the top unit, and let the fixing roller cool sufficiently. Turn on the power switch. Does any of the following apply? • The fixing heater fails to turn on. • E000	YES	See the appropriate section.
Main thermistor	2	Turn off the power switch, and let the fixing roller cool sufficiently. Turn on the power switch, and select service mode '109'. (fixing main thermistor detection temperature display) Does the reading remain unchanged at '109'? (After the check, be sure to turn off the power switch.)	YES	Check the wiring from J108 on the DC controller PCB to the thermistor; if normal, replace the thermistor.
Sub thermistor (TH2)	3	Turn off the power switch, and let the fixing roller cool sufficiently. Turn on the power switch, and select service mode '110'. (fixing sub thermistor temperature display) Does the reading remain unchanged at '110'? (After the check, be sure to turn off the power switch.)	YES	Check the wiring from J109 on the DC controller PCB to the thermistor; if normal, replace the thermistor.
Thermistor (TH1, TH2)	4	Is the thermistor in even contact with the upper fixing roller?	NO	Mount the thermistor correctly.
Thermistor (TH1, TH2)	5	Clean the area of contact of the thermistor. Is the problem corrected?	YES	End.
Operating environment	6	Is the operating environment as indicated?	NO	• Inform the user that the operating environment does not meet the requirements. • Instruct the user not to turn on the copier before the room is warm enough.
DC controller PCB			YES	Replace the DC controller PCB.

4. E004

Cause	Step	Checks	Yes/No	Actions
Fixing heater (H1)	1	Execute service mode '412' (error clear) to clear E004. Turn on the power switch. Does the fixing heater turn on?	NO	See "The fixing heater fails to turn on."
Triac	2	Replace the power supply PCB. Is the problem corrected?	YES	End.
DC controller PCB			NO	Check the wiring from the power supply PCB to the DC controller PCB; if normal, replace the DC controller PCB.

5. E010

Cause	Step	Checks	Yes/No	Actions
Connector	1	Are all connectors of the main motor (M1) connected?	NO	Connect the connectors.
Power supply PCB	2	Turn on the power switch. Set the meter range to 30 VDC, and connect the probes to J209-4 (+) and J209-3 (-) on the DC controller PCB. Is the voltage about 24 V?	NO	See "DC power is absent."
Main motor (M1)	3	Replace the main motor. Is the problem corrected?	YES	End.
DC controller PCB			NO	Replace the DC controller PCB.

6. E013

Cause	Step	Checks	Yes/No	Actions
Waste toner feeding screw	1	Is the flag of the waste toner feeding screw locked sensor rotating when the main motor is rotating?	NO	Remove the drum unit, and turn the feeding screw by hand. If it rotates easily, check how it is mounted. If it does not turn, replace the drum unit, and remove the cause.
Waste toner feeding screw locked sensor (PS8)	2	Is the waste toner feeding screw locked sensor normal? (See the instructions on how to check the photointerrupters.)	NO	Check the wiring from the DC controller PCB to PS8; if normal, replace PS8.
DC controller PCB			YES	Replace the DC controller PCB.

7. E030

Cause	Step	Checks	Yes/No	Actions
Total copy counter (CNT1)	1	Turn off the power switch, and disconnect J102 from the DC controller PCB. Set the meter range to 1 KΩ, and connect the probes to J102-A11 and J102-A10. Is the resistance about 500 Ω?	NO	Check the wiring from the DC controller PCB to the counter; if normal, replace the counter.
Total copy counter (CNT1)	2	Connect J102 to the DC controller PCB, and turn on the power switch. Set the meter range to 30 VCD, and connect the probes J102-A11 (+) and J102-A10 (-) on the DC controller PCB. Does the voltage change from about 0 to about 24 and then to about 0 V when the Start key is pressed?	YES	Replace the counter.
DC controller PCB			NO	Replace the DC controller PCB.

8. E031

Cause	Step	Checks	Yes/No	Actions
Accessory counter (CNT2)	1	Turn off the power switch, and disconnect J102 from the DC controller PCB. Set the meter range to 1 KΩ, and connect the probes to J102-A13 and J102-A12. Is the resistance about 500 Ω?	NO	Check the wiring from the DC controller PCB to the counter; if normal, replace the counter.
Accessory counter (CNT2)	2	Connect J102 to the DC controller PCB, and turn on the power switch. Set the meter range to 30 VDC, and connect the probes to J102A13 (+) and J102-A12 (-) on the DC controller PCB. Does the voltage change from about 0 to about 24 and then to about 0 V when the Start key is pressed?	YES	Replace the counter.
DC controller PCB			NO	Replace the DC controller PCB.

9. E202 (The keys on the control panel fail to operate.)

Cause	Step	Checks	Yes/No	Actions
	1	Does the scanner move forward or in reverse until E202 is detected?	NO	See "The scanner fails to move."
Scanner home position sensor (PS1)	2	Is the scanner home position sensor normal? (See the instructions on how to check the photointerrupters.)	NO	Check the wiring from the DC controller PCB to the sensor; if normal, replace the sensor.
DC controller PCB			YES	Replace the DC controller PCB.

10. E208

Cause	Step	Checks	Yes/No	Actions
	1	Does the mirror move when the power switch is turned on?	NO	See "The mirror fails to move."
Mirror home position sensor (PS3)	2	Is the mirror home position sensor normal? (See the instructions on how to check the photointerrupters.)	NO	Check the wiring from the DC controller PCB to the sensor; if normal, replace the sensor.
DC controller PCB			YES	Replace the DC controller PCB.

11.E210

Cause	Step	Checks	Yes/No	Actions
	1	Turn on the power switch. Does the lens move?	NO	See "The lens fails to move."
Lens home position sensor (PS2)	2	Is the lens home position sensor normal? (See the instructions on how to check the photointerrupters.)	NO	Check the wiring from the DC controller PCB to the sensor; if normal, replace the sensor.
DC controller PCB			YES	Replace the DC controller PCB.

12. E220

Cause	Step	Checks	Yes/No	Actions
	1	Does the scanning lamp (LA1) remain off?	YES	See "The scanning lamp fails to turn on."
Lamp regulator PCB	2	Set the meter range to 30 VDC, and connect the probes to J211-2 (+) and J211-1 (-) on the DC controller PCB. Is the voltage between the terminals when the scanning lamp turn on about 5 V?	NO	Check the wiring from the DC controller PCB to the lamp regulator PCB; if normal, replace the lamp regulator PCB.
DC controller PCB			YES	Replace the DC controller PCB.

13. E261

Cause	Step	Checks	Yes/No	Actions
Power supply PCB	1	Replace the power supply PCB. Is the problem corrected?	YES	End.
Power supply frequency			NO	If E261 is indicated often, advise the user to install a frequency stabilizer.

14. E710/E711

Cause	Step	Checks	Yes/No	Actions
Malfunction	1	Turn off and then on the power switch. Is the problem corrected?	YES	End.
DC controller PCB			NO	Replace the DC controller PCB.

15. E712

Cause	Step	Checks	Yes/No	Actions
Malfunction	1	Turn off and then on the power switch. Is the problem corrected?	YES	End.
Connector	2	Is the connector (J754) used between the ADF and the copier connected securely?	NO	Connect the connector securely.
ADF PCB	3	Replace the ADF controller PCB. Is the problem corrected?	YES	End.
DC controller PCB			NO	Replace the DC controller PCB.

16. E717

Cause	Step	Checks	Yes/No	Actions
Malfunction	1	Turn off and then on the power switch. Is the problem corrected?	YES	End.
Connector	2	Is the connector (J722) used between the Remote Diagnostic Device II and the copier connected securely?	NO	Connect the connector securely.
DC controller PCB	3	Replace the DC controller PCB. Is the problem corrected?	YES	End.
Remote Diagnostic Device II			NO	See the Service Manual of the Remote Diagnostic Device II.

17. E800

Cause	Step	Checks	Yes/No	Actions
Malfunction	1	Turn off and then on the power switch. Is the problem corrected?	YES	End.
Power supply PCB	2	Replace the power supply PCB. Is the problem corrected?	YES	End.
DC controller PCB			NO	Check the wiring and continuity from the DC controller PCB to the control panel PCB; if normal, replace the DC controller PCB.

18. E805

Cause	Step	Checks	Yes/No	Actions
	1	Check service mode '106' (E805 details) while 'E805' is being indicated.		Make the checks in step 2 and later to identify the fan that caused the error.
Connector	2	Are the connectors from the connector on the DC controller PCB to the exhaust fan proper?	NO	Connect the connectors.
Exhaust fan (FM2, FM4, FM5)	3	Replace the exhaust fan. Is the problem corrected?	YES	End.
DC controller PCB			NO	Check the wiring from the DC controller PCB to the exhaust fan; if normal, replace the DC controller PCB.

19. E821

Cause	Step	Checks	Yes/No	Actions
Ozone filter	1	Replace the ozone filter. Is the problem corrected?	YES	End.
Cleaner thermistor (TH3)	2	Turn on the power switch, and select service mode 111 (clean thermistor detection temperature). Do the reading remain as ‘111’?	YES	Check the wiring from J112 on the DC controller PCB to the thermistor; if normal, replace the thermistor.
DC controller PCB			NO	Replace the DC controller PCB.

20. AC power is absent.

Cause	Step	Checks	Yes/No	Actions
Power cord	1	Is the power cord connected to the copier?	NO	Connect the cord.
Power plug	2	Is the power plug connected to the power outlet?	NO	Connect the power plug.
Main power supply	3	Is the rated AC voltage present at the power outlet?	NO	This is not the copier's problem. Inform the user accordingly.
Front door	4	Is the front door closed securely?	NO	Close the front door.
	5	Is the rated voltage present between J204-1 and J204-3 on the DC controller PCB?	YES	End.
Circuit breaker (CB1, CB2)	6	Press the button on the circuit breaker (CB1, CB2). Is AC power supplied?	YES	End.
Power cord	7	Replace the power supply cord. Is AC power supplied?	YES	End.
			NO	Check the wiring of the AC power line. Check the connector for contact.
Fuse	8	Is the fuse (FU1, FU2) on the DC power supply PCB blown? (125 V, 5 A for 120 V model; 250 V, 2 A for 230 V model)	YES	Remove the cause, and replace the fuse.
Power supply PCB	9	Set the meter range to 30 VDC, and connect the meter probes to J105-4(+) and J105-5(-) on the DC controller PCB. Is the voltage reading about 5 V?	NO	Check the wiring from J105 on the DC controller PCB to the power supply PCB; if normal, replace the power supply PCB.
Wiring	10	Is there continuity between J101-B15 on the DC controller PCB and J403-1 on the DC controller PCB?	NO	Check the wiring.
	11	Is there continuity between J212-1 on the DC power supply PCB and J106-2 on the DC controller PCB?	NO	Check the wiring.
Control panel PCB	12	Replace the control panel PCB. Is the problem corrected?	YES	End.
DC controller PCB			NO	Replace the DC power supply PCB.

21. DC power supply is absent.

<table>
<tr><th>Cause</th><th>Step</th><th>Checks</th><th>Yes/No</th><th>Actions</th></tr>
<tr><td>AC power supply</td><td>1</td><td>Is the rated voltage present between J204-1 and J204-3 on the DC power supply PCB?</td><td>NO</td><td>See "AC power is absent."</td></tr>
<tr><td>Fuse (power supply PCB)</td><td>2</td><td>Is the fuse (FU1, FU2, FU3, FU4, FU5) on the power supply blown?</td><td>YES</td><td>Remove the cause, and replace the fuse.</td></tr>
<tr><td>Wiring, DC load</td><td rowspan="2">3</td><td rowspan="2">Turn off the power switch, and disconnect the power plug. Disconnect J208, J209, J210 on the power supply PCB. Connect the power plug, and turn on the power switch. At this time, is the voltage between the following terminals normal?
<table>
<tr><th>+</th><th>–</th><th>Output voltage</th></tr>
<tr><td>J208-1</td><td>J208-2</td><td>+24V</td></tr>
<tr><td>J208-3</td><td>J208-5</td><td>+5VU</td></tr>
<tr><td>J208-4</td><td>J208-5</td><td>+5VR</td></tr>
<tr><td>J209-4</td><td>J209-3</td><td>+24V</td></tr>
<tr><td>J210-1</td><td>J210-2</td><td>+24V</td></tr>
<tr><td>J210-8</td><td>J210-2</td><td>+5VU</td></tr>
<tr><td>J211-7</td><td>J211-1</td><td>+24V</td></tr>
<tr><td>J211-5</td><td>J211-1</td><td>+5VU</td></tr>
</table></td><td>YES</td><td>Check the wiring and the connectors of the DC power supply line.</td></tr>
<tr><td>Power supply PCB</td><td>NO</td><td>Replace the power supply PCB.</td></tr>
</table>

22. The scanner fails to move.

Cause	Step	Checks	Yes/No	Actions
Belt, Cable	1	Are the scanner drive belt and cable routed correctly?	NO	Route the belt and cable correctly, and check the pulley.
Scanner path	2	Is the scanner rail free of soiling and object, and does the scanner move smoothly when pushed by hand?	NO	Remove any dirt and object; check for an object that may come into contact with the scanner. As necessary, clean and lubricate, or repair. **Note:** If the rail is soiled, clean it with alcohol, and then apply a small amount of oil.
Scanner motor (M2)	3	Replace the scanner. Is the problem corrected?	YES	End.
DC controller PCB			NO	Check the wiring from the DC controller PCB to the scanner motor; if normal, replace the DC controller PCB.

23. The lens fails to move.

Cause	Step	Checks	Yes/No	Actions
Bolt	1	Is the lens drive belt routed correctly?	NO	Correct the belt, and check the gears.
Lens path	2	Is the lens path free of dirt and foreign object? Does the lens move smoothly when pushed by hand?	NO	Remove any dirt and object; check for any object that may come into contact with the lens. As necessary, clean and lubricate, or repair.
Lens motor (M3)	3	Replace the lens motor. Is the problem corrected?	YES	End.
DC controller PCB			NO	Check the wiring from the DC controller PCB to the lens motor; if normal, replace the DC controller PCB.

24. The mirror fails to move.

Cause	Step	Checks	Yes/No	Actions
Mirror path	1	Turn off the power, and move the mirror assembly by hand. Does it move smoothly?	NO	Remove any dirt or foreign object in the mirror path. As necessary, clean and lubricate the path.
Mirror motor (M4)	2	Replace the mirror motor. Is the problem corrected?	YES	End.
DC controller PCB			NO	Check the wiring from the DC controller PCB to the mirror motor; if normal, replace the DC controller PCB.

25. The scanning lamp fails to turn on.

Cause	Step	Checks	Yes/No	Actions
Scanning lamp (LA1)	1	Is the scanning lamp mounted correctly?	NO	Disconnect the power plug from the power outlet, and mount the scanning lamp correctly.
Thermal fuse (FU1)	2	Disconnect the power plug from the power outlet, and remove the thermal fuse. Is there electrical continuity when the probes of the meter are connected across both terminals of the thermal fuse?	NO	Replace the thermal fuse. **Caution:** The scanning lamp may have turned on abnormally, the thermal fuse may have been mounted incorrectly, or the cooling fan may have malfunctioned. Be sure to find out the cause.
Scanning lamp (LA1)	3	Set the meter range to 'Ωx1', and disconnect the connector J55. Does the meter index swing when the probes of the meter are connected across both terminals of the scanning lamp?	NO	Replace the scanning lamp.
Lamp regulator PCB	4	Replace the lamp regulator PCB. Is the problem corrected?	YES	End.
Wiring			NO	Check the AC harness from the power supply PCB and the lamp regulator PCB and the scanning lamp. Check the DC harness from the DC controller PCB to the lamp regulator PCB.
DC controller PCB	5	Set the meter range to the 30 VDC, and connect the probes of the meter to J106-4 (+) and J105-5 (-) on the DC controller PCB. Does the voltage change from about 0 to 5 V when the Start key is pressed?	NO	Replace the DC controller PCB.

26. The pre-exposure lamp fails to turn on.

Cause	Step	Checks	Yes/No	Actions
Pre-exposure lamp (LA2)	1	Set the meter range to 30 VDC, and connect the probes to J104-A6 (+) and J104-7 (-) on the DC controller PCB. Does the voltage change from 0 to 24 V when the Start key is pressed?	YES	Check the wiring from the DC controller PCB to the pre-exposure lamp; if normal, replace the pre-exposure lamp.
DC controller PCB			NO	Replace the DC controller PCB.

27. The blank exposure lamp fails to turn on.

Cause	Step	Checks	Yes/No	Actions
Blank exposure lamp (LA3)	1	Replace the blank exposure lamp. Is the problem corrected?	YES	End.
DC controller PCB			NO	Check the wiring from the DC controller PCB to the blank exposure lamp; if normal, replace the DC controller PCB.

28. Pick-up fails. (cassette)

Cause	Step	Checks	Yes/No	Actions
Copy paper	1	Are the size of the copy paper in the cassette and the size indicated by the cassette size indicator identical?	NO	Set the cassette size indicator once again.
Right door	2	Is the right door closed securely?	NO	Close the right door securely.
	3	Is the leading edge of copy paper as far as the registration roller?	YES	See "The registration roller fails to rotate."
Pick-up roller	4	Is the pick-up roller soiled or worn?	YES	If the pick-up roller is soiled, clean it with alcohol. If it is deformed by wear, replace it.
Registration clutch (CL1), Feeding clutch (CL2)	5	Open the right door, and press the Copy Start key while holding paper over the right door open/closed sensor. Does the feeding roller or the pull-out roller rotate?	NO	Check the drive gear for damage. Check the wiring from the DC controller PCB to each clutch; if normal replace the clutch.
Pick-up solenoid (SL1)	6	Set the meter range to 30 VDC, and connect the meter probes to J107-B8(+) and J107-B9(-). Does the voltage reading change from 0 to 24 V when the Start key is pressed?	NO	Check the wiring from the DC controller PCB to SL1; if normal, replace SL1.
DC controller PCB			YES	Replace the DC controller PCB.

29. Pick-up operation fails. (multifeeder)

Cause	Step	Checks	Yes/No	Actions
	1	Is the leading edge of copy paper as far as the registration roller?	YES	See "The registration roller fails to rotate."
Multifeeder solenoid (SL2)	2	Set the meter range to 30 VDC, and connect the probes to J107-B3 (+) and J107-B4 (-) on the DC controller PCB. Does the voltage change from 0 to 24 V when the Start key is pressed?	YES	Check the wiring from the DC controller PCB to the multifeeder solenoid; if normal, replace the solenoid.
DC controller PCB			NO	Replace the DC controller PCB.
Multifeeder roller clutch (CL3)	3	Set the meter range to 30 VDC, and connect the probes to J107-B1 (+) and J107-B2 (-). Does the voltage change from 0 to 24 V when the Start key is pressed?	YES	Check the wiring from the DC controller PCB to multifeeder roller clutch; if normal, replace the clutch.
DC controller PCB			NO	Replace the DC controller PCB.

30. The registration roller fails to rotate.

Cause	Step	Checks	Yes/No	Actions
Registration paper sensor (PS5)	1	Is the registration paper sensor normal? (See the instructions on how to check photointerrupters.)	NO	Check the wiring from the DC controller PCB to the registration paper sensor; if normal, replace the sensor.
Registration roller clutch (CL1)	2	Set the meter to the 30 VDC, and connect the probes to J211-7 (+) and J211-6 (-). Does the voltage change from 0 to 24 V when the Start key is pressed?	YES	Check the drive gear for damage. Check the wiring from the DC controller PCB to registration roller clutch; if normal, replace the clutch.
DC controller PCB			NO	Replace the DC controller PCB.

31. The fixing heater fails to turn on.

Cause	Step	Checks	Yes/No	Actions
Thermal switch (TSW1)	1	Turn off the power switch, and remove the fixing assembly. Set the meter range to "Ωx1." Does the meter index swing when the probes are connected across both terminals of the thermal switch?	NO	Replace the thermal switch.
Fixing heater (H1)	2	Turn off the power switch, and remove the fixing assembly. Is there continuity when probes are connected across both terminals of the fixing heater?	NO	Replace the fixing heater.
DC controller PCB	3	Set the meter range to 30 VDC, and connect the probes to J106-21 (+) and J105-4 (-) on the DC controller PCB. Is the resistance about 5 V?	NO	Replace the DC controller PCB.
Wiring			YES	Check the AC harness from the DC power supply PCB to the fixing heater. Check the DC harness from the DC controller PCB to the DC power supply PCB.

32. The Add Toner indicator does not flash/turn on.

Cause	Step	Checks	Yes/No	Actions
Connector	1	Are the connector J15 of the toner sensor, relay connectors J721 and J722, and the connector J102 on the DC controller PCB connected securely?	NO	Connect the connectors securely.
Toner sensor (TS1)	2	Replace the toner sensor. Is the problem corrected?	YES	End.
Control panel PCB	3	Execute service mode '409' (control panel check). Does the Add Toner indicator turn on?	NO	Check the wiring from the DC controller PC to the control panel PCB; if normal, replace the control panel PCB.
DC controller PCB			YES	Replace the DC controller PCB.

33. The Add Toner indicator fails to turn off.

Cause	Step	Checks	Yes/No	Actions
	1	Open and close the front door. Does it turn off?	YES	End.
Connector	2	Are the connector J15 of the toner sensor, relay connectors J721 and 720, and connector J102 on the DC controller PCB on the DC controller PCB connected securely?	NO	Connect the connectors securely.
Toner sensor (TS1)	3	Replace the toner sensor. Is the problem corrected?	YES	End.
DC controller PCB			NO	Replace the DC controller PCB.

34. The Waste Toner Box Full indicator fails to flash/turn on.

Cause	Step	Checks	Yes/No	Actions
Connector	1	Are the connectors up to the waste toner sensor connected securely?	NO	Connect the connectors securely.
Waste toner sensor	2	Replace the waste toner sensor. Is the problem corrected?	YES	End.
Control panel PCB	3	Execute service mode ‘409’ (control panel check). Does the Waste Toner Box Full indicator turn on?”	NO	Check the wiring from the DC controller PCB to the control panel PCB; if normal, replace the control panel PCB.
DC controller PCB			YES	Replace the DC controller PCB.

35. The Waste Toner Box Full indicator fails to turn off.

Cause	Step	Checks	Yes/No	Actions
Waste toner box	1	Is the waste toner box mounted?	NO	Install the waste toner box.
	2	Is the waste toner box full?	YES	Replace the waste toner box.
Waste toner box	3	Is the mouth of the waste toner box soiled?	YES	Clean it. If the dirt cannot be removed, replace the waste toner box.
Connector	4	Are the connectors to the waste toner sensor connected securely?	NO	Connect the connectors securely.
Waste toner sensor	5	Replace the waste toner sensor. Is the problem corrected?	YES	End.
DC controller PCB			NO	Replace the DC controller PCB.

36. The Add Paper indicator fails to flash.

Cause	Step	Checks	Yes/No	Actions
Sensor (PS4, PS7)	1	Are the following sensors normal? (See the instructions on how to check the photointerrupers.) PS4 Cassette paper sensor PS7 Multi paper sensor	NO	Check the wiring from the sensor lever and each sensor to the DC controller PCB; if normal, replace the sensor.
Control panel PCB	2	Execute service mode '409' (control panel check). Does the Add Paper indicator turn on?	NO	Check the wiring from the DC controller PCB to the control panel PCB; if normal, replace the control panel PCB.
DC controller PCB			YES	Replace the DC controller PCB.

37. The Add Paper indicator fails to turn off.

Cause	Step	Checks	Yes/No	Actions
Cassette	1	Is the cassette set correctly?	NO	Set the cassette correctly.
Sensor (PS4, PS7)	2	Are the following sensors normal? (See the instructions on how to check the photointerrupers.) PS4 Cassette paper sensor PS7 Multi paper sensor	NO	Check the wiring from the sensor lever and each sensor to the DC controller PCB; if normal, replace the sensor.
DC controller PCB			YES	Replace the DC controller.

38. The Jam indicator fails to flash.

Cause	Step	Checks	Yes/No	Actions
Sensor (PSS5, PS6)	1	Are the following sensors normal? (See the instruction on how to check the photointerrupters.) PS5 Registration paper sensor PS6 Delivery paper sensor	NO	Check the wiring from the sensor lever and each sensor to the DC controller PCB; if normal, replace the sensor.
Control panel PCB	2	Execute service mode '409' (control panel check). Does the Jam indicator turn on?	NO	Check the wiring from the DC controller PCB to the control panel PCB; if normal, replace the control panel PCB.
DC controller PCB			YES	Replace the DC controller PCB.

39. The Jam indicator fails to turn off.

Cause	Step	Checks	Yes/No	Actions
	1	Has all paper been removed from inside the copier?	NO	Remove the paper.
	2	Execute service mode '101' (jam type display) to find out which sensor detected the jam. Is there paper around the sensor?	YES	Remove the paper.
Sensor	3	Is the sensor of step 2 normal? (See the instructions on how to check the photointerrupters.)	NO	Check the wiring from the sensor lever and each sensor to the DC controller PCB; if normal, replace the sensor.
DC controller PCB			YES	Replace the DC controller PCB.

40. The Set Control Card indicator fails to turn on.

Cause	Step	Checks	Yes/No	Actions
Control Card IV N	1	Can copies be made without setting the Control Card IV N?	YES	Check the connector of the Control Card IV N for a short circuit.
Control panel PCB	2	Replace the control panel PCB. Does the indicator turn on?	YES	End.
DC controller PCB			NO	Replace the DC controller PCB.

41. The Set Control Card indicator fails to turn off.

Cause	Step	Checks	Yes/No	Actions
Control card	1	Is the Control Card set correctly?	YES	Set the control card correctly.
DC controller PCB	2	Can copies be made?	YES	Replace the DC controller PCB.
Control Card IV N			NO	Replace the Control Card IV N.

B. Cassette Feeding Module

1. E904

Cause	Step	Checks	Yes/No	Remedy
Cam home position sensor (PS104)	1	Is the cam home position sensor (PS104) working normally? (See photointerrupter check method)	NO	Check wiring from light-blocking plate and PS104 to DC controller PCB, and if normal, replace PS104.
Cassette motor (M101)	2	Does cassette motor (M101) rotate when power is switched on?	NO	Check wiring from M101 to DC controller PCB, and if normal, replace M101.
Cassette PCB	3	Is there any improvement when cassette PCB is replaced?	YES	Completed
DC controller PCB			NO	Replace DC controller PCB.

2. Fails to Pick Up

Cause	Step	Checks	Yes/No	Actions
Copy paper	1	Are copy paper in cassette and size shown on cassette size indicator the same?	NO	Reset cassette size indicator.
Right door	2	Is the right door shut securely?	NO	Shut right door securely.
	3	Has leading edge of paper gone through to registration rollers?	YES	See "Registration rollers do not rotate".
Pick-up rollers	4	Are the rollers dirty or worn?	YES	If rollers are dirty, clean with alcohol solution. If deformed due to wear, replace them.
Cassette motor (M101)	5	Do feed rollers and vertical path rollers rotate when copy Start key is pressed with right door open and paper inserted in right door open/close sensor?	NO	Check whether drive gear is damaged. Check wiring from DC controller PCB to M101, and if normal, replace M101.
Pick-up solenoid (SL101)	6	Set tester range to 30V DC and connect tester lead bar to J122-A1 (+) and J122-B4 (-) on DC controller PCB. Does it move from 0V to 24V when Start key is pressed?	NO	Check wiring from DC controller PCB to SL101, and if normal, replace SL101.
Cassette PCB	7	Is there any improvement when cassette PCB is replaced?	YES	Completed
DC controller PCB			NO	Replace DC controller PCB.

3. Load Paper Indicator Fails to Flash

Cause	Step	Checks	Yes/No	Actions
Cassette paper sensor (PS101)	1	Is cassette paper sensor (PS101) working normally? (See photointerrupter check method)	NO	Check wiring from sensor lever and PS101 to DC controller PCB, and if normal, replace PS101.
Control panel PCB	2	Does load paper indicator light up when service mode is set on "409" (check everything lights on control panel)?	NO	Check wiring from DC controller PCB to control panel PCB, and if normal, replace control panel PCB.
Cassette PCB	3	Is there any improvement when cassette PCB is replaced?	YES	Completed
DC controller PCB			NO	Replace DC controller PCB.

4. Load Paper Indicator Fails to Extinguish

Cause	Step	Checks	Yes/No	Actions
Cassette improperly installed	1	Has cassette been installed correctly?	NO	Install cassette correctly
Cassette paper sensor (PS101)	2	Is cassette paper sensor (PS101) working normally? (See photointerrupter check method)	NO	Check wiring from sensor lever and PS101 to DC controller PCB, and if normal, replace PS101.
Cassette PCB	3	Is there any improvement when cassette PCB is replaced?	YES	Completed
DC controller PCB			NO	Replace DC controller.

V. TROUBLESHOOTING FEEDING PROBLEMS

A. Copy Jams

The copier may be divided into the following in terms of where copy paper tends to jam.

[1] Pick-up/feeding assembly

[2] Fixing/delivery assembly

The instructions on how to remove copy paper in the following tables are organized according to location.

You may find out the location and the nature of each jam in service mode ('107').

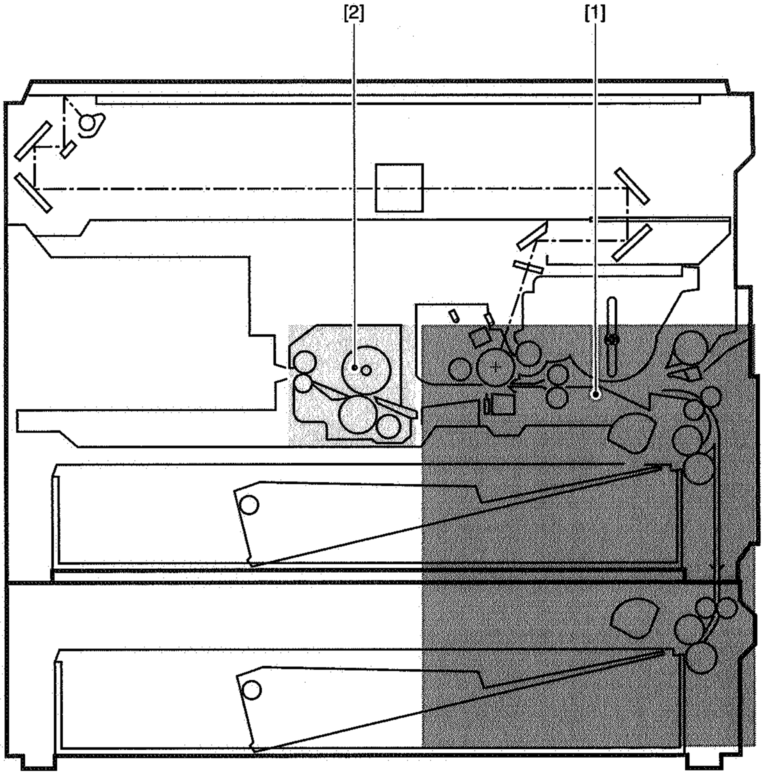


Figure 11-501

1. Pick-Up/Feeding Assembly

Cause	Step	Checks	Yes/No	Actions
	1	Does the jam occur when paper is picked up from the cassette?	NO	Go to step 8.
Cassette	2	Is the cassette set in the copier correctly?	NO	Set the cassette correctly.
	3	Try a different cassette. Is the problem corrected?	YES	Check the inside of the cassette for foreign matter.
Copy paper	4	Is the copy paper curled, wavy, or the like?	YES	Replace the copy paper. Instruct the user on the correct method of storing copy paper.
	5	Try paper of a type recommended by Canon. Is the problem corrected?	YES	Advise the user to use recommended paper.
	6	Does the pick-up roller of the selected cassette holder rotating during copying operation?	NO	See "The pick-up operation fails. (cassette)"
Pick-up roller	7	Is the pick-up roller deformed or worn?	YES	Replace the pick-up roller.
Separation roller	8	Is the separation roller deformed or worn?	YES	Replace the separation roller.
Feeding roller	9	Is the feeding roller deformed or worn?	YES	Replace the feeding roller.
Registration roller drive assembly	10	Does the registration roller operate normally?	NO	See "The registration roller fails to rotate."
Registration roller vertical path roller	11	Is the registration roller or the vertical path roller deformed or worn?	YES	Replace the roller.
Transfer charging assembly	12	Is the transfer charging assembly set correctly?	NO	Check the transfer charging assembly.
	13	Is there foreign matter on the paper guide of the transfer charging assembly?	YES	Remove the foreign matter.
	14	Make a copy in manual mode. Does the main motor rotate?	NO	See "The pick-up operation fails. (multifeeder)"
Copy paper	15	Try paper recommended by Canon. Is the problem corrected?	YES	Advise the user to use recommended paper.
Pick-up roller			NO	Check the pick-up roller for deformation and wear.

2. Fixing/Delivery Assembly

Cause		Step	Checks	Yes/No	Actions
Separation claw (delivery assembly)		1	Is the separation claw worn, deformed, or soiled?	YES	1. Replace the separation claw. 2. If dirt is found, clean it.
Fixing assembly	Upper/lower fixing roller, Heat discharging roller	2	Is the upper/lower fixing roller or the heat discharging roller deformed or damaged?	YES	Replace the roller.
	Paper guide	3	Is the paper guide soiled with toner or the like?	YES	Clean the paper guide.
		4	Is the height of the paper guide correct?	NO	Adjust the height.
	Nip	5	Is the lower roller pressure (nip) as indicated?	YES	Adjust it.
Delivery assembly	Delivery lever	6	Does the delivery detecting lever move smoothly?	NO	Adjust the lever so that it moves smoothly.
	Delivery paper sensor (PS06)	7	Does the delivery sensor operate normally? (See the instructions on how to check the photointerrupters.)	NO	Replace the sensor.
	Delivery roller drive assembly	8	Does the delivery roller move smoothly?	NO	Check the delivery roller drive assembly.
Leading edge margin				YES	Check the copy to see if it has a leading edge.

B. Faulty Feeding

1. Double Feeding

Cause	Step	Checks	Yes/No	Actions
Separation pad	1	Is the separation pad deformed, worn, or soiled?	YES	Replace the separation pad.
Spring			NO	Push up the separation pad, and replace the spring.
Separation roller	2	Is the separation roller deformed, worn, or soiled?	YES	Replace the separation roller.
Spring			NO	Replace the spring used to pull the separation roller.

2. Wrinkles

Cause		Step	Checks	Yes/No	Actions
Pick-up assembly		1	Turn off the power while copy paper is moving through the feeding assembly. Is the paper wrinkled? Or, is the paper askew?	YES	Check the pick-up assembly. Check the registration roller.
Copy paper		2	Try copy paper fresh out of package. Is the problem corrected?	YES	The copy paper may be moist. Instruct the user on the correct method of storing copy paper.
		3	Is the paper of a type recommended by Canon?	NO	Advise the user to use recommended paper.
Fixing assembly	Paper guide	4	Is the paper guide soiled with toner or the like?	YES	Clean it.
		5	Is the height of the paper guide correct?	NO	Adjust the height of the paper guide.
	Lower roller pressure	6	Is the lower roller (nip) as indicated?	NO	Adjust it
	Upper/lower roller			YES	Try replacing the top unit or the lower roller.

VI. ARRANGEMENT AND FUNCTIONS OF ELECTRICAL PARTS

A. Sensors and Switches

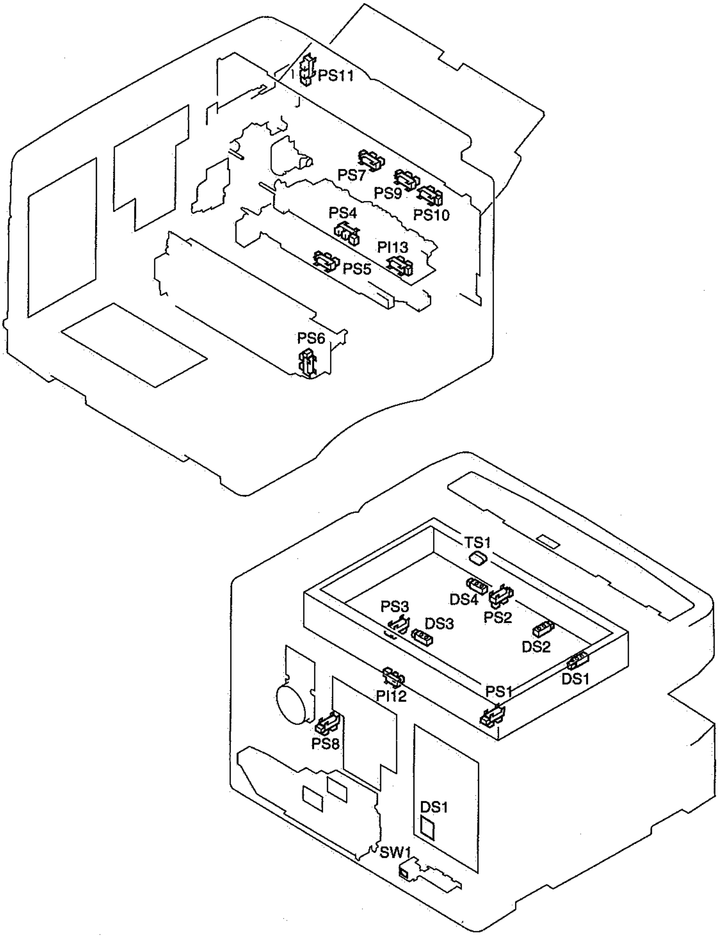
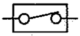

PS11
PS7
PS9
PS10
PS4
PI13
PS5
PS6
TS1
DS4
PS3
PS2
DS3
DS2
DS1
PI12
PS1
PS8
DS1
SW1

Figure 11-601

Symbol	Name	Notation	Description
	Toner sensor	TS1	Developing assembly toner level detection
	Photointerrupter	PS1	Scanner home position detection
		PS2	Lens home position detection
		PS3	Mirror home position detection
		PS4	Cassette paper detection
		PS5	Registration paper detection
		PS6	Delivery detection
		PS7	Multifeeder paper detection
		PS8	Waste toner feeding screw locked detection
		PS9	Multifeeder paper width detection 1
		PS10	Multifeeder paper width detection 2
		PS11	Right door open/closed detection
		PS12*	Copy board cover open/close sensor
		PS13*	Vertical path paper sensor
		DS1*	Document size detection sensor 1
		DS2*	Document size detection sensor 2
		DS3*	Document size detection sensor 3
		DS4*	Document size detection sensor 4
	Switch	SW1	Heater switch (accessory)
		DS1	Front door switch

*NP7210 only

Table 11-601

B. Motors, Fans, Clutches, and Solenoids

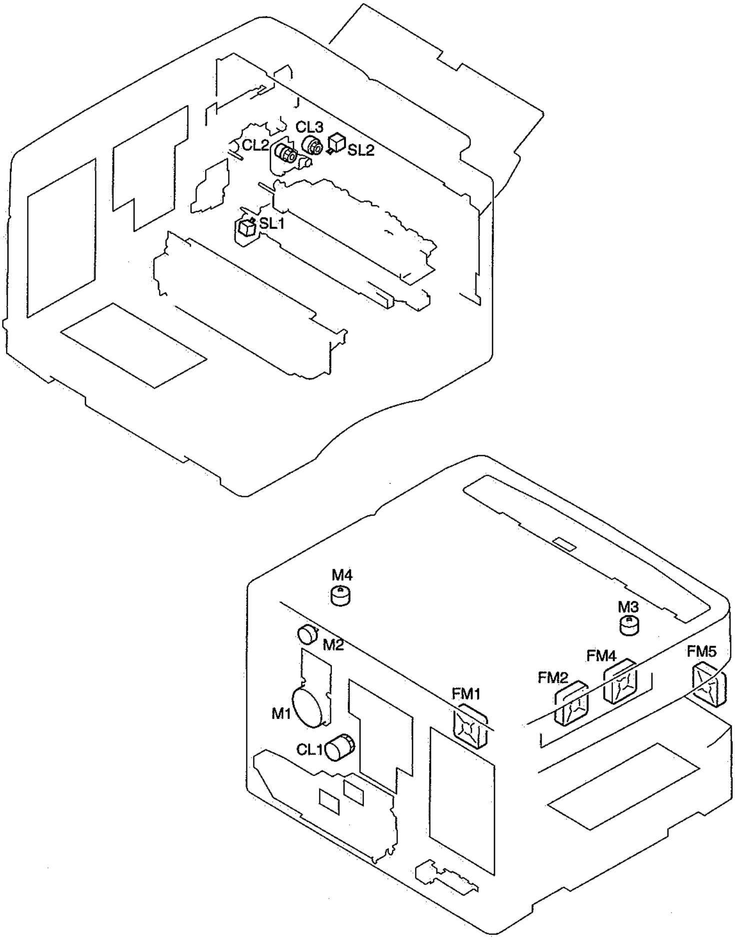

CL3
CL2
SL2
SL1
M4
M3
M2
FM4
FM5
FM2
FM1
M1
CL1

Figure 11-602

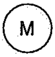
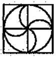
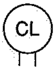
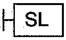
Symbol	Name	Notation	Description
	Motor	M1	Main drive
		M2	Scanner drive
		M3	Lens drive
		M4	No. 4/No. 5 mirror drive
	Fan	FM1	Cooling
		FM2	Heat discharge
		FM4	Heat discharge
		FM5	Heat discharge (accessory)
	Clutch	CL1	Registration roller clutch
		CL2	Feeding clutch
		CL3	Multifeeder pick-up clutch
	Solenoid	SL1	Pick-up solenoid
		SL2	Multifeeder pick-up solenoid

Table 11-602

C. Heaters, Lamps, and Others

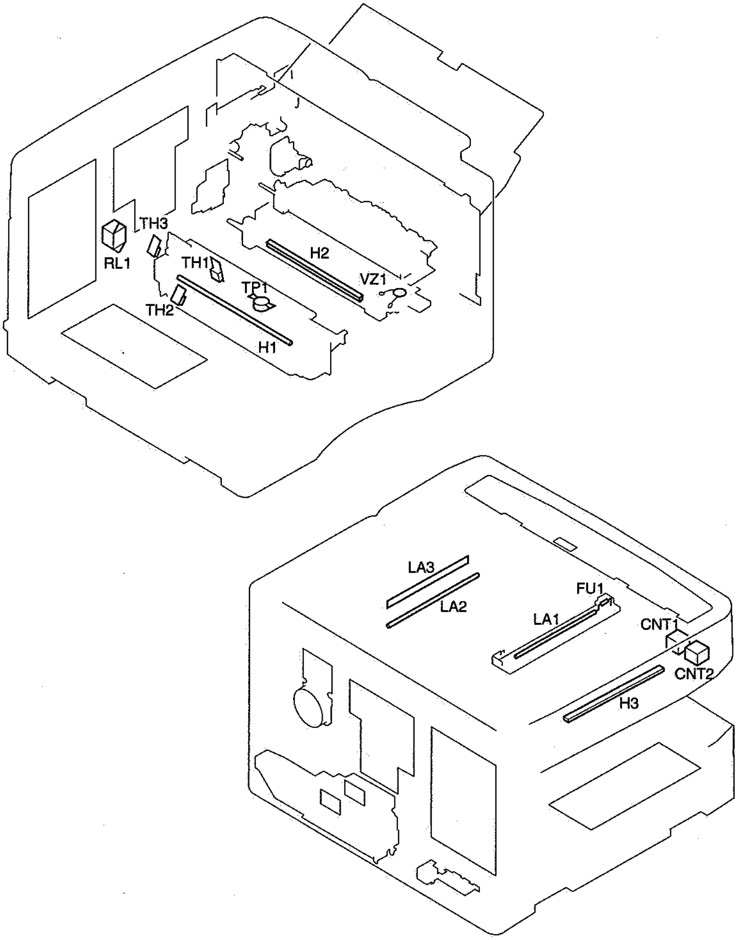

TH3
RL1
TH1
H2
VZ1
TP1
TH2
H1
LA3
FU1
LA2
LA1
CNT1
CNT2
H3

Figure 11-603

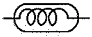
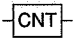
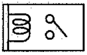
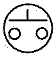
Symbol	Name	Notation	Description
	Heater	H1 H2 H3	Fixing heater Cassette/drum heater (accessory) Mirror heater (accessory)
	Lamp	LA1	Scanning lamp
	LED	LA2 LA3	Pre-exposure lamp Blank exposure lamp
	Counter	CNT1 CNT2	Total copy counter Accessory counter
	Relay	RL1	Fixing heater power supply control
	Thermal fuse	FU1	Scanning lap overheating detection
	Thermal switch	TSW1	Fixing assembly overheating detection
	Thermistor	TH1 TH2	Fixing roller surface temperature detection 1 Fixing roller surface temperature detection 2
	Cleaner thermistor	TH3	Ambient temperature detection
	Varistor	VZ1	Varistor

Table 11-603

D. PCBs

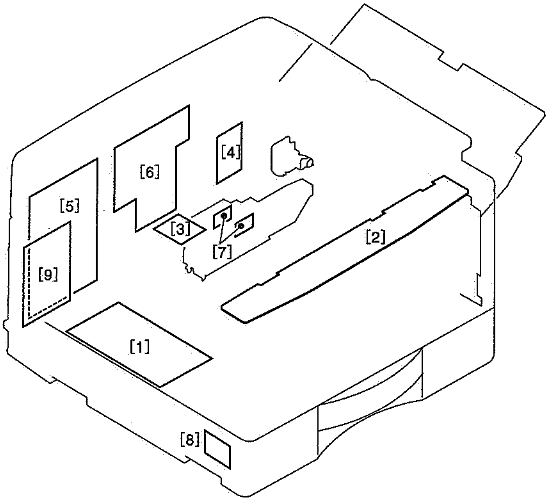


Figure 11-604

Ref.	Name	Description
[1]	DC controller PCB	Sequence control
[2]	Control panel PCB	Control key/control display
[3]	AE sensor	Original density detection
[4]	Lamp regulator PCB	Scanning lamp on voltage control
[5]	Power supply PCB	Power supply
[6]	High-voltage power supply PCB	High-voltage output
[7]	Waste toner sensor	Waste toner full detection
[8]	Cassette size switch PCB	Cassette size detection
[9]	Accessory power supply PCB	ADF and sorter DC power supply

Table 11-604

E. Cassette Feeding Module

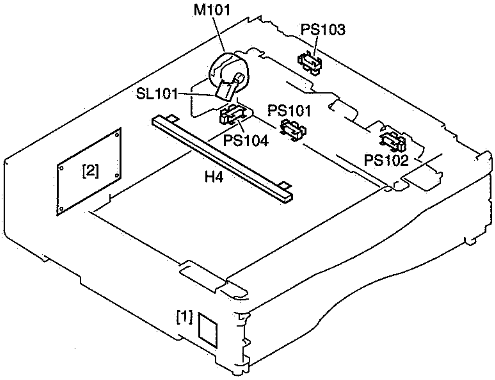


Figure 11-605

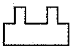
Symbol	Name	Notation	Description
	Photointerrupter	PS101 PS102 PS103 PS104	Cassette paper detection Vertical path paper detection Door open detection Swing cam home position detection
M	Motor	M101	Caseette motor drive
SL	Solenoid	SL101	Cassette pick-up solenoid
	Heater	H4	Cassette heater
	PCB	[1] [2]	Cassette size switch PCB Cassette relay PCB

Table 11-605

F. Variable Resistors, Light-Emitting Diodes, and Check Pins by PCB

Of the variable resistors (VR), light-emitting diodes (LD), and check pins used in the copier, those needed for servicing work in the field are discussed.

Caution:

1. Some LEDs retain current even when off and emit dim light. This is a normal condition and must be kept in mind.
2. VRs that may be used in the field.. ●
3. VRs that must not be used in the field... ⊘

Caution:

Do not use the VRs or check pins not found in the tables. They are for factory use, and require special tools and high accuracy.

1. DC Controller PCB

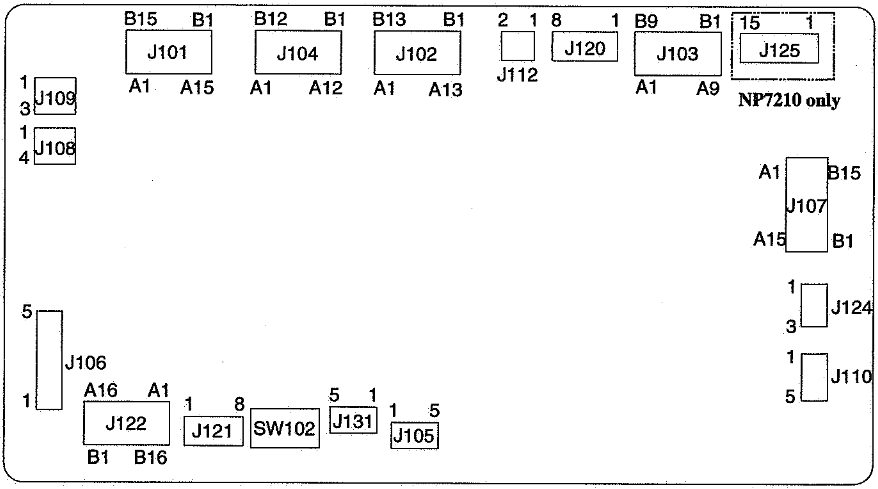

B15
B1
J101
A1
A15
B12
B1
J104
A1
A12
B13
B1
J102
A1
A13
2
1
J112
8
1
J120
B9
B1
J103
A1
A9
15
1
J125
NP7210 only
1
3
J109
1
4
J108
A1
B15
J107
A15
B1
1
3
J124
1
5
J110
5
1
J106
A16
A1
J122
B1
B16
1
8
J121
SW102
5
1
J131
1
5
J105

Figure 11-606

	Item	Remarks		
SW102-1	Use to change size.	Settings	SW102-1	SW102-2
		INCH	ON	ON
		A	OFF	ON
SW102-2		AB/INCH	ON	OFF
		AB	OFF	OFF
SW102-3	Use to set power supply voltage.	ON :230V	OFF : 120V	
SW102-4	—	—		
SW102-5	Use to set the accessory counter.	Settings	SW102-5	SW102-6
		No accessory counter	OFF	OFF
		Small-size copy counter	ON	OFF
SW102-6		Large-size copy counter	OFF	ON
		Not used	ON	ON
SW102-7	Large size copy counting method	ON: 2 counts	OFF: 1 count	
SW102-8	—	—		

Table 11-606

Inch-configuration (4R3E)	Ratio
200%	200.0%
LTR→11"×17"	129.4%
LGL→11"×17"	121.4%
100%	100.0%
LGL→LTR	78.6%
11"×17"→LGL	73.3%
11"×17"→LTR	64.7%
50%	50.0%

Table 11-607

A-configuration (2R2E)	Ratio
200%	200.0%
A4→A3	141.4%
100%	100.0%
A3→A4	70.7%
50%	50.0%

Table 11-608

AB/Inch-configuration (4R4E)	Ratio
200%	200.0%
A4/LTR→A3, B5→B4	141.4%
A4/LTR→B4	122.4%
B4→A3, B5→A4/LTR	115.4%
100%	100.0%
A3→B4, A4/LTR→B5	86.5%
B4→A4/LTR	81.6%
A3→A4/LTR, B4→B5	70.7%
50%	50.0%

Table 11-609

AB-configuration (4R4E)	Ratio
200%	200.0%
A4→A3, B5→B4	141.4%
A4→B4	122.4%
B4→A3, B5→A4	115.4%
100%	100.0%
A3→B4, A4→B5	86.5%
B4→A4	81.6%
A3→A4, B4→B5	70.7%
50%	50.0%

Table 11-610

2. Power Supply PCB

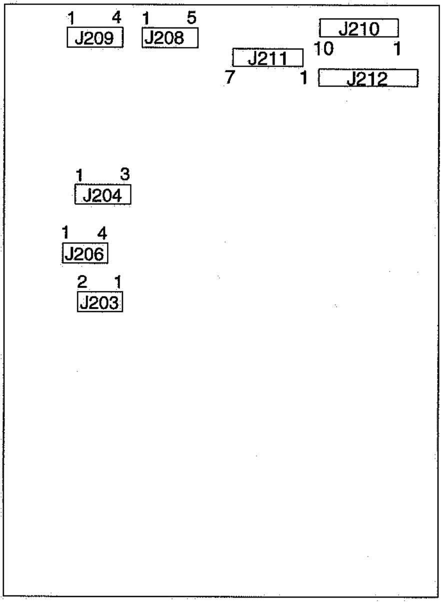

1
4
J209
1
5
J208
J210
10
1
J211
7
1
J212
1
3
J204
1
4
J206
2
1
J203

Figure 11-607

3. Lamp Regulator PCB

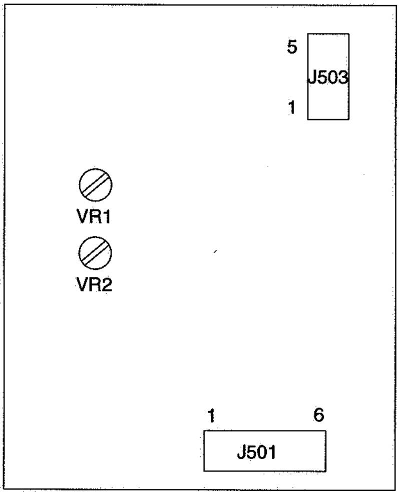

5
J503
1
VR1
VR2
1
6
J501

Figure 11-608

4. High-Voltage Power Supply PCB

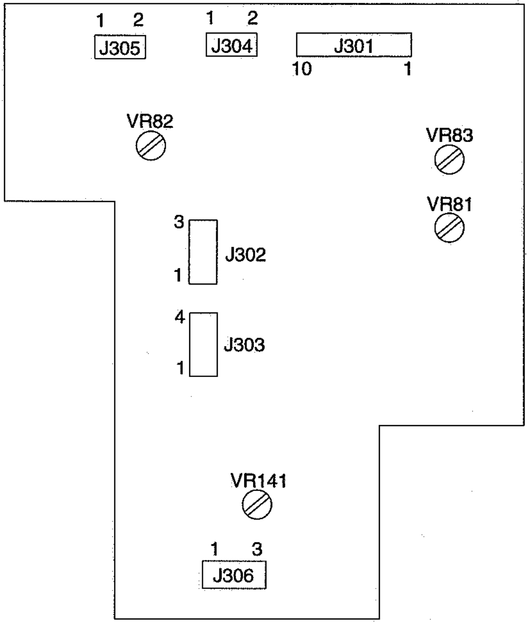

1
2
J305
1
2
J304
J301
10
1
VR82
VR83
VR81
3
J302
1
4
J303
1
VR141
1
3
J306

Figure 11-609

5. Cassette Relay PCB

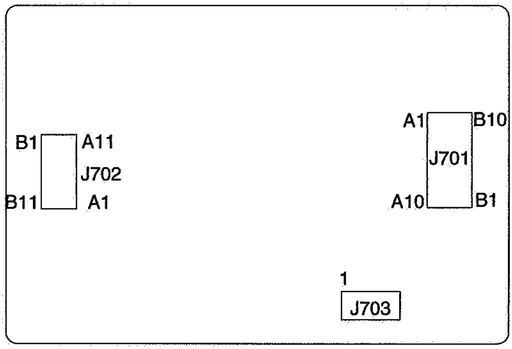

B1
A11
J702
B11
A1
A1
B10
J701
A10
B1
1
J703

Figure 11-610

VII. SERVICE MODE

A. Outline

The copier's service mode is divided into the following seven:

No.	Description
[1]	DISPLAY
[2]	I/O DISPLAY
[3]	ADJUST
[4]	FUNCTION
[5]	OPTION
[6]	COUNTER
[7]	APPLICATION

Table 11-701

B. Using Service Mode

1. Starting Service Mode

1) Press the User Mode key.
   - If you are planning to make checks as in I/O display mode while making copies, select the appropriate copying mode before pressing the User Mode key.
2) Hold down the '2' and '8' keys on the keypad at the same time for 0.5 sec or more.
3) Press the User Mode key once again.
   - The copier will indicate '[1]' on its control panel as soon as it enters service mode.
   - The copier will end service mode in response to a press on the Reset key.

2. Selecting Service Mode

1) Select the mode you want for making checks or adjustments (Table 11-701) using the keypad.
   - The 10's place will switch to indicate the input numeral.
   - The copier will start making copies in response to a press on the Start key using the settings that were effective immediately before the start of service mode.
2) Press the AE key.
   - The copier will indicate a 3-digit number, and the 100's place will start to flash and 10' and 1's places will turn on.
3) Select the mode you want to use for making checks or adjustments using the keypad.
   - The 10's and 1's places will serve to indicate the input numerals.
   - The copier will return to the condition in step 1) above in response to a press on the AE key.
4) Press the Start key to execute the selected service mode.
   - The copier will return to the condition in step 3) in response to a press on the AE key while it is executing service mode.

C. Using Adjust Mode and Function Mode

In adjust mode and function mode, the copier stores the settings made on the control panel in the RAM on the DC controller PCB and use them to simulate the functions of conventional variable resistors and switches.

Figure 11-701 shows the label affixed to the back of the toner supply sheet (stored inside front door).

If you have replaced the DC controller PCB or initialized the RAM, you will have to enter the values recorded in the label into the RAM on the DC controller PCB. Moreover, if you have entered any values newly in the field, be sure to record the value in this label.

No.		TYP		
301	AE_ADJ			
302	LMP_ADJ			
303	AE_SLOP			
305	REGIST			
306	LE_BLANK			
307	PG_RGST			
308	PG_BLANK			
309	TE_BLANK			
319	MF_ARCH			
320	CST1_ARCH			
321	CST2_ARCH			
326	LIGHT_5			

No.		TYP		
327	LNS_HP			
328	MIRR_HP			
329	LNS_TBL			
330	MIRR_TBL			
331	MLT_CL			
332	MLT_TMG			
513	FIX_CNT1			
514	FIX_CNT2			
515	FIX_CNT3			
516	FIX_CNT4			
519	MODEL_SW			

No.		TYP		
701	DOC_ST_L			

	FRONT	REAR
P.(mm)		
T.(mm)		

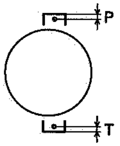


Figure 11-701

D. Display Mode [1]

- To select an item, use the keypad.
- To execute an item, use the Start key.
- To cancel an item, use the Clear key.

No.	Description	Remarks
101	Indicates the type of jam.	Indicates the type of jam. (See Table 11-702.)
106	E805	Indicates the code of the fan that caused E805. 01: exhaust fan at rear (FM2) 02: exhaust fan at fount (FM4) 03: sorter kit fan (FM5)
107	Indicates a history of jams.	Indicates the most recent five jams. A press on '1' through '5' keys will show the respective jams. (See Table 11-702.)
108	Indicates a history of errors.	Indicates the most recent five error codes. A press on '1' through '5' keys will show their respective error codes and the number being pressed.
109	Indicates the temperature detected by the fixing main thermistor (TH1).	unit: °C
110	Indicates the temperature detected by the fixing sub thermistor (TH2).	unit: °C
111	Indicates the temperature detected by the cleaner thermistor (TH3).	unit: °C
112	Indicates the output voltage of the AE sensor.	A press on the Start key will execute AE scanning. The output voltage of the AE sensor is indicated in decimal notation using three digits (e.g., 245 V will be indicated as '245').
113	Indicates the version of the ROM.	Indicates the version of the program.
114	Indicates the release number of the ROM.	Indicates the release number of the program.
115	Indicates the jam history of the ADF.	Indicates the history of the most recent five jams. A press on the '1' through '5' keys will indicate the type of their respective jams. (See Table 11-703.)
116	Indicates the jam history of the sorter.	Indicates the history of the most recent five jams. A press on the '1' through '5' keys will indicate the type of their respective jams. (See Table 11-705.)
117	Indicates the type of jam in the ADF.	Indicates the type of jam. (See Table 11-703.)
118	Indicates the type of warning for the ADF.	Indicates alarm codes of the ADF. (See Table 11-704.)
119	Indicates the version of the ROM of the ADF.	Indicates the version of the program.

No.	Description	Remarks
120	Indicates the release number of the ROM of the ADF.	Indicates the release number of the program.
121	Indicates the type of jam in the sorter.	Indicates the type of jam in the sorter. (See Table 11-705.)
122	Indicates the tray warning for the sorter.	Indicates the alarm code for the sorter. (See Table 11-706.)
123	Indicates the stapling alarm for the sorter.	Indicates the alarm code for the sorter. (See Table 11-707.)
124	Indicates the version of the ROM of the sorter.	Indicates the version of the program.
125	Indicates the release number of the ROM of the sorter.	Indicates the release number of the program.
126	Checks the keys on the control panel.	See p. 11-90.
127*	Document Size Indicator	Indicates codes for document sizes detected by document size sensor. (See Table 11-709)

*NP7210 only

Guide to Jam Types (No. 101) and Jam History (No. 107)

- The type of jam is indicated using the following codes in the 10's and 1's places. In the case of the history, the number corresponding to the keys on the keypad will be indicated in the 100's place.

Code	Description	Sensor
01	Registration delay jam	PS5
02	Registration stationary jam	
03	Registration paper sensor timing jam	
04	Delivery delay jam	PS6
05	Delivery stationary jam	
06	Right door open jam	PS11
07	Power-on jam	PS5, PS6
40	ADF jam	
50	Sorter jam	

Table 11-702

Guide to ADF Jam History (No. 115) and ADF Jam Type (No. 117)

- The type of jam is indicated using the following codes in the 10's and 1's places. In the case of the history, the number corresponding to the keys on the keypad will be indicated in the 100's place.

Code	Description
01	Separation extraction
02	Separation delay
03	Pick-up delay
04	Pick-up leading edge skew
05	Pick-up stationary
06	Pick-up double feeding
07	Pick-up trailing edge skew
08	Pick-up trailing edge retreat
09	Pick-up fault (leading edge)
41	Delivery delay
42	Delivery stationary
81	Open
82	Door open
84	Jam original page
87	Double feeding

Table 11-703

Guide to ADF Warning (No. 118)

Code	Description
02	Tray sensor off
03	Separation fault
04	Separation skew
05	Separation stopper override
11	Original pages-jam recovery pages mismatch
12	Original page in excess of 100
13	Original extraction
14	Original size error

Table 11-704

Guide to Sorter Jam History (No. 116) and Sorter Jam Type (No. 121)

- The type of jam is indicated using the following codes in the 10's and 1's places. In the case of the history, the number corresponding to the keys on the keypad will be indicated in the 100's place.

Code	Description
03	Feeding delay
04	Feeding stationary
05	Timing
06	Staple (stapler sorter only)
07	Power-on
08	Door open

Table 11-705

Guide to Sorter Tray Warning (No. 122)

Code	Description
02	Overstacking

Table 11-706

Guide to Sorter Stapling Warning (No. 123)

Code	Description
01	Stapler down
02	Staple
03	Stapler safety protection
04	Edging fault
05	Stapling overstacking
06	Staple stacking limit
07	Mixed paper sizes (breadthwise)
08	Staple unit absent
09	Paper in stapler
0A	Staple absent

Table 11-707

Checking the Control Panel Keys (No. 126)

1) While the copier is in mode No. 126, press all keys on the control panel except the Start key.
2) Press the Start key.
   - If '000' is indicated on the control panel, all keys are normal.
   - If an error key is found, the copier will indicate its respective code (Table 11-708). If multiple keys are found to be faulty, the copier will indicate the lowest-number code only.

Code	Key	Code	Key
1	Sorter key	17	Interrupt key
2	Auto Zoom key	18	Energy Saver key
3	Photo key	19	Clear key
4	Image Combination / Two-page Separation key	20	ID key
5	AE key	21	Number 0 key
6	Stop key	22	Number 1 key
7	Start key	23	Number 2 key
8	Reduce key	24	Number 3 key
9	1:1 key	25	Number 4 key
10	Enlarge key	26	Number 5 key
11	Paper Select key	27	Number 6 key
12	% key	28	Number 7 key
13	+ Zoom key	29	Number 8 key
14	- Zoom key	30	Number 9 key
15	Reset key	31	Fit Image key
16	Additional Functions key		

Table 11-708

How to Read No. 127 Document Size Indicator (*NP7210 only)

- The document size detected by the document size sensor is indicated by the following codes in single and double figures.

Code	Document size
1	B5
3	A4
4	B5R
5	B4
6	A4R
7	A3
11	LTR
13	LGL
14	LTRR
15	11"X17"
255	Undetected or no document

Table 11-709

E. I/O Display Mode [2]

- To select an item, use the keypad.
- To execute an item, use the Start key.
- To cancel an item, use the Clear key.

No.	Description	Remarks
201	Not used.	
202	Indicates digit 4.	Indicates the state of input. (See p. 11-93.)
203	Indicates digit 5.	Indicates the state of input. (See p. 11-93.)
204	Indicates digit 6.	Indicates the state of input. (See p. 11-93.)
205	Indicates digit 7.	Indicates the state of input. (See p. 11-93.)
206	Indicates the voltage of the fixing main thermistor (TH1).	Indicates the detected voltage. (e.g., 2.78 V will be indicated as '278'.)
207	Indicates the voltage of the fixing sub thermistor (TH2).	Indicates the detected voltage. (e.g., 2.78 V will be indicated as '278'.)
208	Indicates the voltage of the AE sensor.	Indicates the detected voltage. (e.g., 2.78 V will be indicated as '278'.)
209	Indicates the voltage of the cleaner thermistor (TH3).	Indicates the detected voltage. (e.g., 2.78 V will be indicated as '278'.)
216	Indicates the voltage of the density adjusting volume (VR1).	Indicates the detected voltage. (e.g., 2.78 V will be indicated as '278'.)
219	Indicates CPU port 6.	Indicates the state of input. (See p. 11-93.)
220	Indicates CPU port 8.	Indicates the state of input. (See p. 11-93.)
221*	Not used.	
222	Indicates PIO1B.	Indicates the state of input. (See p. 11-93.)
223	Indicates PI03B.	Indicates the state of input. (See p. 11-93.)
224	Not used.	
225	Not used.	

*NP7210 only

Guide to Nos. 202, 203, 204, 205, 219, 220, 221, 222, and 223

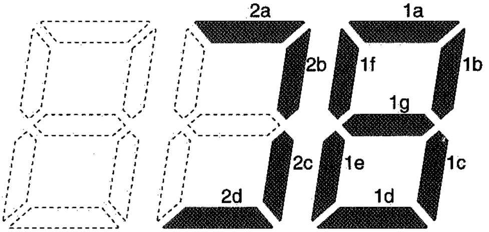


Figure 11-702

No.	LED	Description	Notation	Signal	Connector	Remarks
201	1a	–	–	–	–	–
	1b	–	–	–	–	–
	1c	–	–	–	–	–
	1d	–	–	–	–	–
	1e	–	–	–	–	–
	1f	–	–	–	–	–
	1g	–	–	–	–	–
	2a	–	–	–	–	–
	2b	–	–	–	–	–
	2c	–	–	–	–	–
	2d	–	–	–	–	–
202	1a	Detects the presence/absence of the total copy counter.	CNT1	TCNT_DR*	J102-A10	ON: present.
	1b	Detects the presence/absence of paper in cassette 1.	PS4	CSTPDT	J107-B12	ON: present.
	1c	Detects the presence/absence of a control card.	–	CCDT*	J104-A10	ON: absent.
	1d	Detects the state (open/closed) of the right door.	PS11	RDOPDT	J107-B7	ON: closed.
	1e*	Cassette 1 vertical path paper detection.	PS13	VPDT	J107-B15	ON: absent.
	1f	Cassette 2 vertical path paper detection.	PS102	OP_VPDT	J122-A10	ON: absent.
	1g	–	–	–	–	–
	2a	–	–	–	–	–
	2b	Detects paper in the multifeeder.	PS7	MLTPDT0	J107-A8	ON: present.
	2c	Detects the width of paper in the multifeeder (1).	PS9	MLTPDT1	J107-A11	
	2d	Detects the width of paper in the multifeeder (2).	PS10	MLTPDT2	J107-A14	

*NP7210 only

Table 11-710a

No.	LED	Description	Notation	Signal	Connector	Remarks
203	1a	Detects the state (open/closed) of the cassette 2 right door.	PS103	OP_DRDT	J122-A8	ON: closed.
	1b	Detects the presence/absence of paper in cassette 2.	PS101	OP_PDT	J122-B5	ON: present.
	1c	Detects the presence/absence of an accessories counter.	CNT2	OPCNT_DR*	J102-A12	ON: present.
	1d	Detects the presence/absence of the cassette 2.	–	OP_DT*	J122-A9	ON: absent.
	1e	Detects the rotation of the scanner cooling fan.	FM1	SCFAN_DT*	J104-B2	ON: on.
	1f	–	–	–	–	–
	1g	Detects the rotation of the exhaust fan.	FM4	EXFAN0_DT*	J104-B8	ON: on.
	2a	Detects the rotation of the exhaust fan.	FM2	EXFAN1_DT*	J104-B11	ON: on.
	2b	–	–	–	–	–
	2c	–	–	–	–	–
	2d	–	–	–	–	–
204	1a	Cassette 1 size detection 0	SW651	CSTS0	J110-4	ON: on.
	1b	Cassette 1 size detection 1	SW652	CSTS1	J110-3	ON: on.
	1c	Cassette 1 size detection 2	SW653	CSTS2	J110-2	ON: on.
	1d	Cassette 1 size detection 3	SW654	CSTS3	J110-1	ON: on.
	1e	Cassette 2 size detection 0	SW651	OP_CSTS0	J122-B9	ON: on.
	1f	Cassette 2 size detection 1	SW652	OP_CSTS1	J122-B8	ON: on.
	1g	Cassette 2 size detection 2	SW653	OP_CSTS2	J122-B7	ON: on.
	2a	Cassette 2 size detection 3	SW654	OP_CSTS3	J122-B6	ON: on.
	2b	–	–	–	–	–
	2c	–	–	–	–	–
	2d	–	–	–	–	–
205	1a	DSW102-1 setting	–	–	–	ON: on.
	1b	DSW102-2 setting	–	–	–	ON: on.
	1c	DSW102-3 setting	–	–	–	ON: on.
	1d	DSW102-4 setting	–	–	–	ON: on.
	1e	DSW102-5 setting	–	–	–	ON: on.
	1f	DSW102-6 setting	–	–	–	ON: on.
	1g	DSW102-7 setting	–	–	–	ON: on.
	2a	DSW102-8 setting	–	–	–	ON: on.
	2b	–	–	–	–	–
	2c	–	–	–	–	–
	2d	IPC detection (presence/absence)	–	–	–	ON: absence.
219	1a	–	–	–	–	–
	1b	Mirror home position detection	PS3	MRRHP	J103-B8	OFF: at HP.
	1c	Lens home position detection	PS2	LNSHP	J103-B5	OFF: at HP.
	1d	–	–	–	–	–
	1e	–	–	–	–	–
	1f	–	–	–	–	–
	1g	–	–	–	–	–
	2a	–	–	–	–	–
	2b	–	–	–	–	–
	2c	–	–	–	–	–
	2d	–	–	–	–	–

Table 11-710b

No.	LED	Description	Notation	Signal	Connector	Remarks
220	1a	Scanner home position detection	PS1	SCHP	J103-B2	OFF: at HP.
	1b	–	–	–	–	–
	1c	–	–	–	–	–
	1d	–	–	–	–	–
	1e	–	–	–	–	–
	1f	–	–	–	–	–
	1g	–	–	–	–	–
	2a	–	–	–	–	–
	2b	–	–	–	–	–
	2c	–	–	–	–	–
	2d	–	–	–	–	–
221	1a	–	–	–	–	–
	1b	–	–	–	–	–
	1c*	Document size detection sensor power	–	–	–	ON: power on
	1d	–	–	–	–	–
	1e*	Document size detection 0	DS1	DSZ0*	J125-6	ON: absence
	1f*	Document size detection 1	DS2	DSZ1*	J125-12	ON: absence
	1g*	Document size detection 2	DS3	DSZ2*	J125-9	ON: absence
	2a*	Document size detection 3	DS4	DSZ3*	J125-15	ON: absence
	2b	–	–	–	–	–
	2c	–	–	–	–	–
	2d	–	–	–	–	–
222	1a	Waste toner box full detection	–	TNFDT	J106-9	ON: full.
	1b	Main heater triac short circuit detection	H1	–	–	ON: on.
	1c	–	–	–	–	–
	1d	Scanning lamp on detection	LA1	LMPDT	J106-6	ON: on.
	1e	Toner level detection	TS1	TNEMP	J102-B2	ON: present.
	1f	Delivery detection	PS6	EXITPD	J124-2	ON: present.
	1g	Pre-registration paper detection	PS5	RGPDT	J107-A2	ON: present.
	2a	Swing cam home position detection	PS104	OP_CAMHP	J122-B1	ON: at HP.
	2b	–	–	–	–	–
	2c	–	–	–	–	–
	2d	–	–	–	–	–
223	1a	–	–	–	–	–
	1b	–	–	–	–	–
	1c	–	–	–	–	–
	1d	–	–	–	–	–
	1e	Zero-cross direction detection	–	–	–	–
	1f	Waste toner feedscrew lock detection	PS8	TRQMLDT	J106-10	
	1g*	Copyboard cover closed detection	PS12	CBCCDT	J125-2	ON: closed
	2a	Main motor (M1) lock detection	M1	MM_LKDT*	J106-16	ON: motor off.
	2b	–	–	–	–	–
	2c	–	–	–	–	–
	2d	–	–	–	–	–

*NP7210 only

Table 11-710c

F. Adjust Mode [3]

- To select an item, use the keypad.
- To execute an item, press the Start key.
- To change a setting, use the keypad or the +/- Zoom key.
- To enter a value, press the Start key.
- To remove an item, press the AE key.

No.	Description	Settings	Remarks
301	Executes AE auto adjustment.	—	Use it to perform AE adjustment. (See p. 11-19.)
302	Adjust the lamp intensity for AE mode.	450 – 750 (120V model) 0 – 590 (230V model)	A lower setting will increase the intensity of the scanning lamp (LA1), making the copies lighter. (Use it when performing AE adjustment.)
303	Adjusts the copy density (developing bias) slope for AE mode.	0 – 255	A lower setting will make the copies lighter. (Use it when performing AE adjustment.)
305	Adjust the leading edge margin (registration roller clutch CL1 activation timing).	0 – 500	A higher setting will delay pick-up of copy paper in relation to the image, thereby decreasing the leading edge margin. (unit: 0.21 mm)
306	Adjusts the leading edge non-image width (blank exposure lamp LA3 de-activation timing).	0 – 500	A higher setting will delay de-activation of the lamp, thereby increasing the leading edge non-image width. (unit: 0.21 mm)
307	Adjusts the leading edge registration on right pages in page separation (registration roller clutch CL1 activation timing).	0 – 500	A higher setting will delay pick-up of copy paper in relation to the image, thereby decreasing the leading edge margin. (unit: 0.21 mm)
308	Adjusts the leading edge margin on right pages in page separation mode (blank exposure lamp LA3 de-activation timing).	0 – 500	A higher setting will delay de-activation of the lamp, thereby increasing the leading edge non-image width. (unit: 0.21 mm)
309	Adjusts the trailing edge margin (blank exposure lamp LA3 activation timing).	0 – 500	A lower setting will advance activation of the lamp, thereby increasing the trailing edge margin. (unit: 0.21 mm)
319	Adjusts the arching in multifeeder mode (de-activation of the multifeeder pick-up roller clutch CL3).	0 – 200	A higher setting will delay deactivation of the clutch, thereby increasing arching. (unit; 0.21 mm)
320	Adjusts the arching in cassette 1 pick-up mode (de-activation of pick-up roller clutch CL2).	0 – 100	A higher setting will increase the arching. (unit: 0.42 mm)
321	Adjusts the arching in cassette 2 pick-up mode (de-activation of the pick-up roller clutch).	0 – 100	A higher setting will delay de-activation of the clutch, thereby increasing the arching. (unit: 0.42 mm)

No.	Description	Settings	Remarks
326	Adjusts the activation voltage of the scanning lamp.	450 – 660 (120V model) 0 – 390 (230V model)	A higher setting will increase the intensity of the scanning lamp (LA1), making the copies lighter.
327	Adjusts the position of the lens (Direct at 100%).	0 – 200	A higher setting will enlarge the image. (unit:0.1 mm)
328	Adjusts mirror home position (at 100% ratio).	0 – 400	A higher setting will enlarge the image. (unit: 0.05 mm)
329	Selects a table for lens travel to suit reproduction ratio.	0 – 3	If you replaced the DC controller PCB or initialized the RAM, be sure to enter the value recorded on the Service Label stored behind the front door.
330	Selects a table for No. 4/No. 5 mirror travel to suit reproduction ratio.	0 – 3	If you replaced the DC controller PCB or initialized the RAM, be sure to enter the value recorded on the Service Label stored behind the front door.
331	Adjusts the timing of activation of the multifeeder pick-up clutch (CL3). Use this mode if double feeding or pick-up failure cannot be corrected by adjusting the pressure of the separation pad.	0 – 999	A higher setting will delay activation of the clutch. (unit: 2m sec) • If pick-up failure occurs, decrease the setting. • If double feeding occurs, increase the setting.
332	Adjusts activation of the multifeeder pick-up clutch (CL3) Use this mode if pick-up failure occurs when using thick paper.	0 – 999	A higher setting will delay activation of the clutch. (unit: 2m sec) • If thick paper is not fed as far as the registration roller, increase the setting.

G. Function Mode [4]

- To select an item, use the keypad.
- To execute an item, use the Start key.
- To stop an item, use the Stop key.
- To clear an item, use the Clear key.

Caution:
Be sure that the copier is in standby state when executing any item.

No.	Description	Remarks
401	Stirs toner.	The developing assembly (main motor) will rotate 4 min. (The pre-exposure lamp LA2 and the blank exposure lamp LA3 will turn on, and all high-voltage outputs will turn off.)
402	Releases the multifeeder holding plate.	Releases the multifeeder holding plate.
403	Drum unit installation mode. Execute this mode at the time of drum unit installation or replacement.	The drum unit and developing assembly will rotate 40 sec.
406	Checks the fixing nip.	Checks the fixing nip. (The Stop key will be disabled.)
408	Checks the activation of the scanning lamp (LA1).	The scanning lamp will turn on for 5 sec.
409	Checks all indicators on the control panel.	All LEDs on the control panel will turn on for 5 sec.
410	Checks the forward movement of the scanning lamp.	The scanner moves forward while the + key is held down. The scanner moves in reverse while the - key is held down.
411	Checks the activation of the pre-exposure lamp (LA2).	The pre-exposure lamp will turn on.
412	Initializes E000, E001, E002, E003, or E004.	Press the Start key while the error code (E000, E001, E002, E003, or E004) is indicated.
440	Moves the scanner, lens, and No. 4/No. 5 mirror unit.	Execute this mode before transporting the machine so that the scanner, lens, and No. 4/No. 5 mirror unit will be positioned for transportation.
450	Initializes the back-up RAM.	Press '1' on the keypad and the Start key in sequence. (The power will turn off, initializing all RAM data.)

H. Option Mode [5]

- To select an item, use the keypad.
- To execute an item, use the Start key.
- To change settings, use the keypad or the + and - Zoom keys.
- To store settings, use the Start key.
- To cancel an item, use the Clear key.

No.	Description	Remarks
505	Sets U1 size.	See Table 11-711.
506	Sets U2 size.	See Table 11-711.
510	Sets drum cleaning. To remove dirt from the surface of the photosensitive drum, toner is deposited on the surface after copying operation and the cleaning blade is used to collect the toner together with the dirt. (If '1' is setting of '519', in addition, LSTR is extended by 6.5 sec.)	0: Disable drum cleaning (standard). 1: Execute drum cleaning for every 50 copies (standard in Chinese mode). 2: Execute drum cleaning for every 10 copies. 3: Execute drum cleaning for every 25 copies.
511	Sets the copying start temperature for auto start mode.	0: 140°C (NP7161/NP7160, standard) 155°C (NP7210, standard) 1: 160°C
512	Sets the copying start temperature.	0: 160°C (standard) 1: 180°C
513	Sets the fixing target temperature for paper width > 257mm (A3, A4, 11" × 17", LTR)	0: Standard target temperature 1: Standard target temperature +10°C 2: Standard target temperature + 5°C 3: Standard target temperature - 5°C 4: Standard target temperature -10°C
514	Sets the fixing target temperature for 257mm ≧ paper width > 216mm (B4, B5)	0: Standard target temperature 1: Standard target temperature +10°C 2: Standard target temperature + 5°C 3: Standard target temperature - 5°C 4: Standard target temperature -10°C
515	Sets the fixing target temperature for 216mm ≧ paper width > 182mm (A4R, A5, LGL, LTRR)	0: Standard target temperature 1: Standard target temperature +10°C 2: Standard target temperature + 5°C 3: Standard target temperature - 5°C 4: Standard target temperature -10°C
516	Sets the fixing target temperature for 182mm ≧ paper width (B5R, A5R, STMTR)	0: Standard target temperature 1: Standard target temperature +10°C 2: Standard target temperature + 5°C 3: Standard target temperature - 5°C 4: Standard target temperature -10°C

No.	Description	Remarks
517	Enables/disables retry for cassette pick-up operation. In cassette pick-up mode, pick-up operation will be executed once again without indicating the first registration delay jam.	0: Make a retry (standard). Indicates the Jam message in response to the second registration delay jam. 1: Do not make a retry. Indicates the Jam message in response to the first registration delay jam.
518	Sets the count for the control card in multifeeder pick-up.	0: Increment by 1 for all sizes (standard). 1: Increment by 2 for all sizes.
519	Selects settings to suit the site of installation. Making changes using this mode will change the settings under '510' as follows: • If '1' is selected instead of '0' in this mode, '1' will be set under '510'. • If '0' is selected instead of '1' in this mode, '0' will be set under '510'. However, '510' settings may be changed after making changes in this mode.	0: Normal (standard) 1: China The standard target temperature for fixing will be lowered by 10°C. In addition, 'U14' will be added to user mode.
520*	Switching document size detection (AB/INCH) When the set sizes of the dip switch (SW102) on the DC controller PCB are AB and INCH, switch the detection size of the document size sensor in this mode.	0 : AB (standard) 1 : INCH
523*	Paper size settings for copy speed reducing sequence	0 : For paper less than 216mm wide (standard) 1 : For paper less than 257mm wide
524*	257mm≧paper width>216mm (B4, B5) standard copy speed reducing settings This mode is only effective when "523" is set on 1.	0 : No reduction in copy speed (standard) 1 : Copy speed is same as for NP7161/NP7160
526*	A4R standard copy speed reducing settings	0 : No reduction in copy speed (standard) 1 : Copy speed is same as for NP7161/NP7160

*NP7210 only

Paper Sizes Available under No. 505/506

Code	Paper	Size (vertical x horizontal in mm)
0	BOLIVIA	216.0 x 355.0
1	ARGENTINE OFICIO	220.0 x 340.0
2	ARGENTINE LEGAL	220.0 x 340.0
3	AUSTRALIAN FOOLSCAP	206.0 x 337.0
4	FOOLSCAP	215.9 x 330.2
5	FOLIO	210.0 x 330.0
6	GOVERNMENT LEGAL	203.2 x 330.2
7	ECUADORAN OFICIO	220.0 x 320.0
8	OFFICIO	216.0 x 317.0
9	ARGENTINE LETTER R	220.0 x 280.0
10	KOREAN LEAGAL R	190.0 x 268.0
11	GOVERNMENT LETTER R	203.2 x 266.7
12	ARGENTINE LETTER	280.0 x 220.0
13	GOVERNMENT LETTER	266.7 x 203.2
14	KOREAN LEAGAL	268.0 x 190.0

Table 11-711

I. Counter Mode [6]

- To select an item, use the keypad.
- To execute an item, use the Start key.
- To cancel an item, use the Clear key.
- The result obtained by multiplying the indicated value by 100 will be the actual count.

No.	Description	Remarks
601	Large copy counter	
602	Small copy counter	
603	Total copy counter	
604	ADF large original page counter	
605	ADF small original page counter	
606	Count clear	A press on the Start key will initialize the count (601 to 605), returning it to '0' on the control panel.

J. Application Mode [7]

- To select an item, use the keypad.
- To execute an item, use the Start key.
- To change the value, use the keypad or the + and - Zoom keys.
- To store settings, use the Start key.
- To cancel an item, use the Clear key.

No.	Description	Settings	Remarks
701	Adjusts the ADF original page stop position.	1–255	A lower setting will move the original page stop position in the direction of delivery. (unit: 0.116 mm)

VIII. SELF DIAGNOSIS

The microprocessor on the copier's DC controller PCB is equipped with a function that checks the condition of the machine (especially the condition of sensors). It runs checks at such times as programmed, and will indicate any fault it finds in the form of code.

A. Copier

Code	Cause	Description
E000	• The thermistor (TH1, TH2) has poor contact or an open circuit. • The fixing heater (H1) has an open circuit. • The thermal switch (TSW1) has turned on. • The triac is faulty. • The DC controller PCB is faulty.	• The surface temperature of the fixing upper roller does not reach 40°C within 14 sec after power-on.
E001	• The thermistor (TH1, TH2) has a short circuit. • The triac is faulty. • The DC controller PCB is faulty.	• The surface temperature of the fixing upper roller exceeded 230°C.
E002	• The thermistor (TH1, TH2) has poor contact or an open circuit. • The fixing heater (H1) has an open circuit. • The thermal switch (TSW1) has turned on. • The triac is faulty. • The DC controller PCB is faulty.	• The surface temperature of the fixing upper roller does not reach 60°C within 10 after it exceeded 40°C. • The surface temperature of the fixing upper roller does not reach 80°C within 10 sec after it exceeded 60°C. • The surface temperature of the fixing upper roller does not reach 100°C within 10 sec after it exceeded 80°C. • The surface temperature of the fixing upper roller does not reach 120°C within 10 sec after it exceeded 100°C.
E003	• The thermistor (TH1, TH2) has poor contact or an open circuit. • The fixing heater (H1) has an open circuit. • The thermal switch (TSW1) has turned on. • The triac is faulty. • The DC controller PCB is faulty.	• The surface temperature of the fixing upper roller drops to 130°C or less after it reached the target temperature (160°C) for standby.
E004	• The triac has a short circuit. • The DC controller PCB is faulty.	• The triac is identified as having a short circuit.

Code	Cause	Description
E010	• The main motor (M1) is faulty. • The DC controller PCB is faulty.	• The main motor lock detection signal (MM_LKDT*) is detected for 1 sec continuously while the main motor is being driven.
E013	• The waste toner feedscrew is locked. • The waste toner feedscrew lock sensor (PS8) is faulty. • The DC controller PCB is faulty.	• The waste toner feedscrew lock detection signal (TRQMLDT) does not switch for 0.5 sec or more while the main motor is being driven.
E030	• The total copy counter has an open circuit. • The DC controller PCB is faulty.	• The total copy counter is identified to have an open circuit when the Start key is pressed or when the counter is driven.
E031	• The accessories counter has an open circuit. • The DC controller PCB is faulty.	• The accessories counter is identified as having an open circuit when the Start key is pressed or the couter is being driven.
(E202) No code indication. Keys are disabled. (Note 2)	• The scanner home position sensor (PS1) is faulty. • The scanner motor (M2) is faulty. • The DC controller PCB is faulty.	• The scanner does not return to home position within a specific period of time when it is being moved. • The scanner home position sensor (PS1) remains on during image exposure (forward movement).
E208	• The mirror home position sensor (PS3) is faulty. • The mirror motor (M4) is faulty. • The DC controller PCB is faulty.	• The No. 4/No. 5 mirror unit does not turn on or off the mirror home position sensor (PS3) within a specific period of time while the No. 4/No. 5 mirror unit is being moved.
E210	• The lens home position sensor (PS2) is faulty. • The lens motor (M3) is faulty. • The DC controller PCB is faulty.	• The lens unit does not turn on or off the lens home position sensor (PS2) within a specific period of time when the lens unit is being moved.
E220	• The lamp regulator PCB is faulty. • The DC controller PCB is faulty.	• The scanning lamp turns on during standby. • The scanning lamp turns off during copying.
E261	• The power supply frequency is faulty. • The power supply PCB is faulty.	• The intervals of the zero-cross signals exceed the allowed intervals for 50/60 Hz.

Code	Cause	Description
E710	• The DC controller PCB is faulty.	• IC114 (IPC) on the DC controller PCB cannot be initialized at power -on.
E711	• The DC controller PCB is faulty.	• An IPC communication error has been detected twice or more within 1 sec at power-on.
E712	• The DC controller PCB is faulty. • The ADF controller PCB is fault. • The ADF cable is faulty.	• A communication error with the ADF controller PCB cannot be cleared.
E717	• The DC controller PCB is faulty. • The Remote Diagnostic Device II PCB is faulty.	• A condition in which a response from the Remote Diagnostic Device II cannot be received occurred three times continuously. • The Remote diagnostic Device II communicates an interruption of count pulses.
E800	• The auto power-off circuit has an open circuit. • The DC controller PCB is faulty.	• An open circuit is detected for 5 V or 24 V at power-on.
E805	• The exhaust fan (FM2, FM4) is faulty. • The DC controller PCB is faulty.	• The exhaust fan drive detection signal (EXFAN1_DT*, FXFAN0_DT*) cannot be detected 0.5 sec after the start of the exhaust fan (FM2, FM4).
E821	• The ozone filter is clogged. • The cleaner thermistor (TH3) has poor contact or an open circuit. • The DC controller PCB is faulty.	• The cleaner thermistor (TH3) detects 55°C or more.

Note:

1. When the diagnostic function has turned on, the copier can be reset by turning it off once. This, however, does not apply to E000, E001, E002, E003, or E004.
   This is to prevent the user from resetting the copier easily when the error is caused by an open circuit in the thermistor, otherwise overheating and damaging the fixing roller.
   Normally, the copier will automatically turn off in about 4 sec if it is turned on without clearing E000 through E004.
   To clear E000 through E004, operate as follows:
   1) Select '412' (clear E000–E004) in service mode.
      - The copier's control panel indicates the respective error code.
   2) Press the Start key.
   3) The copier will automatically turn off, clearing the error.
2. E202 may be checked using '108' in service mode (error history indication).

B. ADF

Code	Cause	Description
E400	• The communication cable to the copier has a fault. • The ADF controller PCB has a fault.	• While the ADF is in standby, the communication with the copier is interrupted for 5 sec or more. • While the ADF is in operation, the communication with the copier is interrupted for 0.5 sec or more.
E401	• The separation motor does not rotate. • The crescent sensor is faulty.	• See the ADF Service Manual.
E402	• The main motor (M1) fails to rotate. • The main motor clock sensor (PI3) is faulty.	When the main motor is being driven, no feeding clock pulse is detected after a period of time equivalent of a feed length of 30 mm.
E403	• The feed motor does not rotate. • The feed motor clock is faulty.	• See the ADF Service Manual.
E404	• The delivery motor does not rotate. • The delivery clock is faulty.	• See the ADF Service Manual.
E411	• The width sensor (Q504) is faulty. • The registration sensor (Q502) is faulty.	The output of each sensor drops below the standard 2.00 V in the absence of paper.
E431	• The auto start separation motor does not rotate. • The auto start crescent sensor is faulty. • The auto start separation clock is faulty.	• See the ADF Service Manual.

Note:
When the self diagnosis function has turned on, the ADF may be reset by turning off the copier.
To continue making copies while the ADF is out of order, disconnect the lattice connector on the ADF side, open the ADF, and place an original on the copyboard glass.

C. Sorter

Code	Cause	Description
E500	• Exchange of data with the copier is faulty.	• Communication is monitored at all times. This error occurs when the communication with the copier stops.
E510	• The feed motor does not rotate.	• See the Sorter Service Manual.
E511	• The feed motor rotates too slowly.	• See the Sorter Service Manual.
E513	• The tandem path motor does not rotate.	• See the Sorter Service Manual.
E520	• The stack motor does not rotate.	• See the Sorter Service Manual.
E530	• Guide bar motor (M3) does not rotate.	• The input signal of the guide bar home position sensor (PI6) does not change within the specified time after the motor drive signal has been generated (when returning the guide bar to home position). • The output signal of the guide bar home position sensor (PI6) does not change within the specified time after the motor drive signal has been generated (when moving the guide bar from home position).
E531	• Stapler unit swing motor (M1) does not rotate.	• The stapler unit home position switch (SW1) remains the same for a specific time after the motor drive signal has been generated.
E540	• Bin shift motor (M4) does not rotate.	• The output signal of the lead cam home position sensor (PI1) does not change within the specified time after the motor drive signal has been generated. • While the motor is being driven, the intervals of the output signals of the lead cam home positions sensor (PI1) does not change the specified time. • While the motor is being driven, the overload detecting switch (SW3) turns on. In this case, the bin unit is moved by a single bin and an error is issued.
E541	• The shift motor rotates too slowly.	• See the Sorter Service Manual.
E550	• A timing jam has occurred.	• See the Sorter Service Manual.

D. Cassette Feeding Module

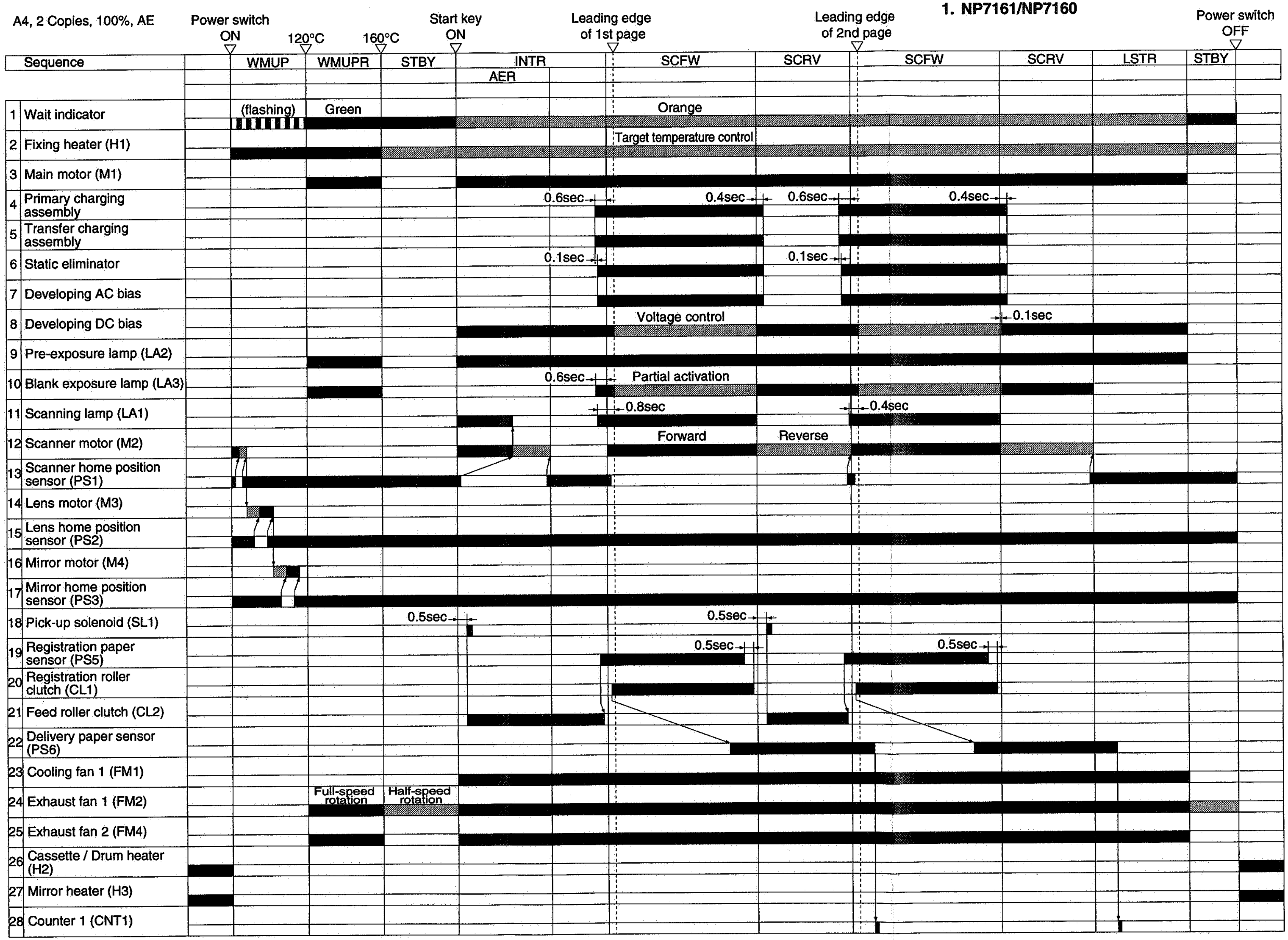
Code	Cause	Description
E904	• The waste toner box swing cam home position sensor (PS104) is faulty. • The cassette motor (M101) is faulty. • The cassette relay PCB is faulty. • The DC controller PCB is faulty.	• The waste toner box swing cam does not return to home position within a specific period of time when the waste toner box swing cam is being driven.

APPENDIX

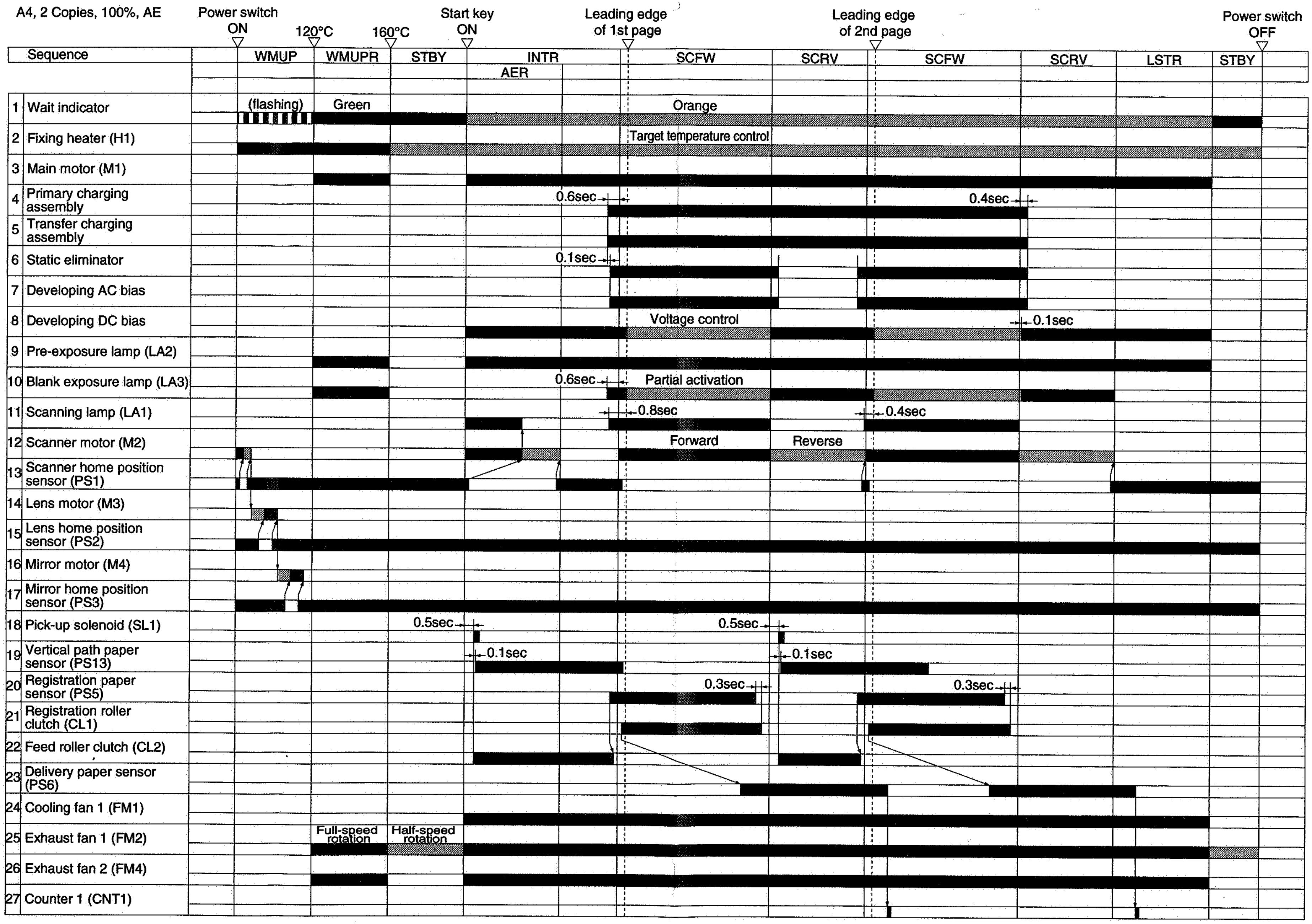
A. GENERAL TIMING CHART A-1
B. SIGNALS AND ABBREVIATIONS A-3
C. GENERAL CIRCUIT DIAGRAM A-5
D. CSSETTE FEEDING MODULE CIRCUIT DIAGRAM A-7
E. SPECIAL TOOLS LIST A-9
F. SOLVENTS AND OILS A-10

A. GENERAL TIMING CHART

1. NP7161/NP7160


A4, 2 Copies, 100%, AE
Power switch ON
120°C
160°C
Start key ON
Leading edge of 1st page
Leading edge of 2nd page
Power switch OFF
Sequence
WMUP
WMUPR
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
1 Wait indicator
(flashing)
Green
Orange
2 Fixing heater (H1)
Target temperature control
3 Main motor (M1)
4 Primary charging assembly
0.6sec
0.4sec
0.6sec
0.4sec
5 Transfer charging assembly
6 Static eliminator
0.1sec
0.1sec
7 Developing AC bias
8 Developing DC bias
Voltage control
0.1sec
9 Pre-exposure lamp (LA2)
10 Blank exposure lamp (LA3)
0.6sec
Partial activation
11 Scanning lamp (LA1)
0.8sec
0.4sec
12 Scanner motor (M2)
Forward
Reverse
13 Scanner home position sensor (PS1)
14 Lens motor (M3)
15 Lens home position sensor (PS2)
16 Mirror motor (M4)
17 Mirror home position sensor (PS3)
18 Pick-up solenoid (SL1)
0.5sec
0.5sec
19 Registration paper sensor (PS5)
0.5sec
0.5sec
20 Registration roller clutch (CL1)
21 Feed roller clutch (CL2)
22 Delivery paper sensor (PS6)
23 Cooling fan 1 (FM1)
24 Exhaust fan 1 (FM2)
Full-speed rotation
Half-speed rotation
25 Exhaust fan 2 (FM4)
26 Cassette / Drum heater (H2)
27 Mirror heater (H3)
28 Counter 1 (CNT1)

2. NP7210


A4, 2 Copies, 100%, AE
Power switch ON
120°C
160°C
Start key ON
Leading edge of 1st page
Leading edge of 2nd page
Power switch OFF
Sequence
WMUP
WMUPR
STBY
INTR
AER
SCFW
SCRV
SCFW
SCRV
LSTR
STBY
1 Wait indicator
2 Fixing heater (H1)
3 Main motor (M1)
4 Primary charging assembly
5 Transfer charging assembly
6 Static eliminator
7 Developing AC bias
8 Developing DC bias
9 Pre-exposure lamp (LA2)
10 Blank exposure lamp (LA3)
11 Scanning lamp (LA1)
12 Scanner motor (M2)
13 Scanner home position sensor (PS1)
14 Lens motor (M3)
15 Lens home position sensor (PS2)
16 Mirror motor (M4)
17 Mirror home position sensor (PS3)
18 Pick-up solenoid (SL1)
19 Vertical path paper sensor (PS13)
20 Registration paper sensor (PS5)
21 Registration roller clutch (CL1)
22 Feed roller clutch (CL2)
23 Delivery paper sensor (PS6)
24 Cooling fan 1 (FM1)
25 Exhaust fan 1 (FM2)
26 Exhaust fan 2 (FM4)
27 Counter 1 (CNT1)
(flashing)
Green
Orange
Target temperature control
0.6sec
0.4sec
0.1sec
Voltage control
0.1sec
0.6sec
Partial activation
0.8sec
0.4sec
Forward
Reverse
0.5sec
0.5sec
0.1sec
0.1sec
0.3sec
0.3sec
Full-speed rotation
Half-speed rotation

B. SIGNALS AND ABBREVIATIONS

1. Signals

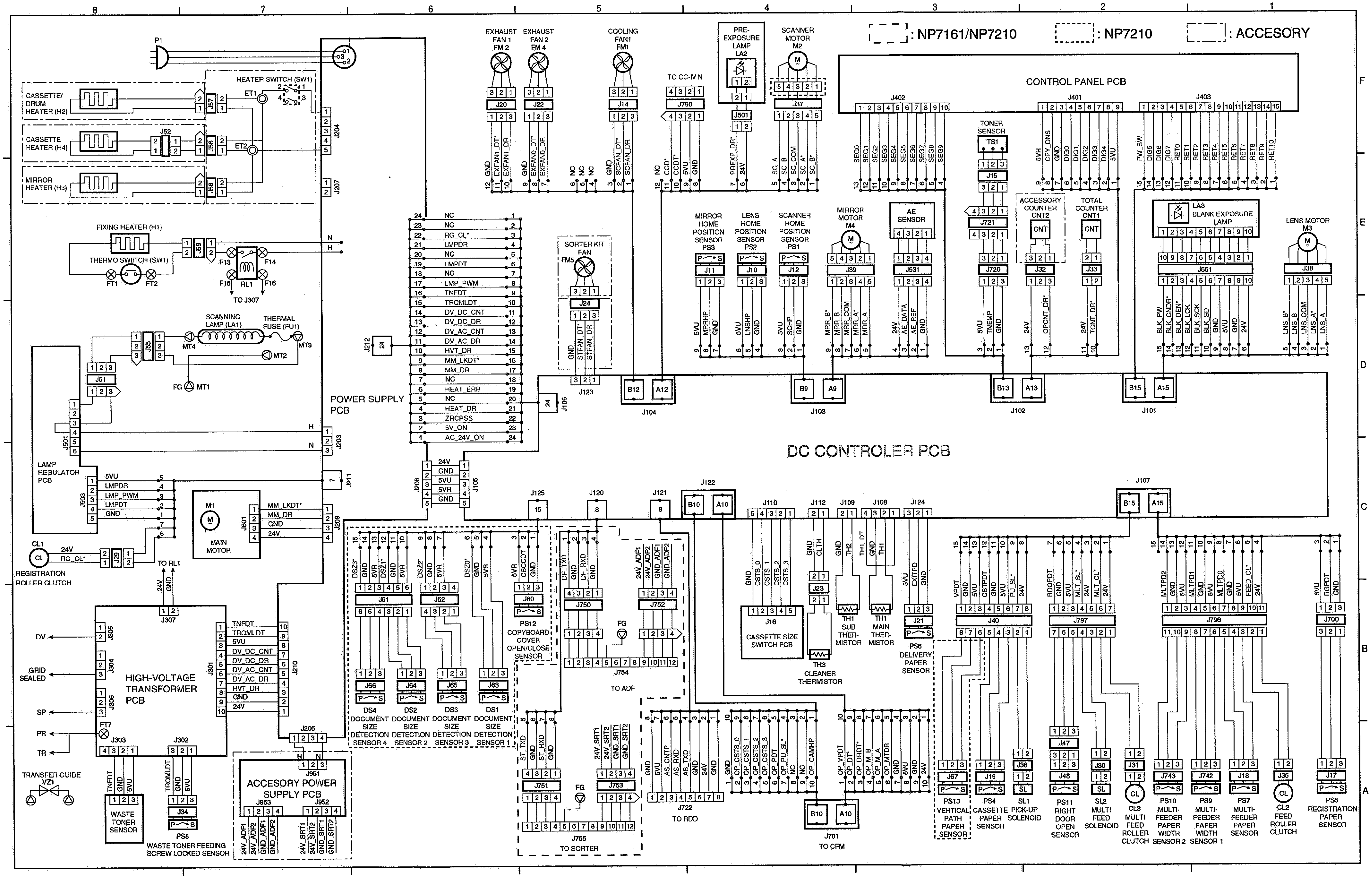
5V_ON	5VU ON signal
AC_24V_ON	AC AND 24V ON signal
[AE_DATA]	AE SENSOR OUTPUT signal
[AE_REF]	AE SENSOR REFERENCE signal
BLK_CNDR*	BLANK EXPOSURE LAMP CENTER DRIVE command
BLK_DEN*	BLANK EXPOSURE LAMP DRIVE ENABLE signal
BLK_LCK	BLANK EXPOSURE LAMP SERIAL DATA LATCH signal
BLK_PW	BLANK EXPOSURE POWER line
BLK_SCK	BLANK EXPOSURE LAMP SERIAL DATA CLOCK signal
BLK_SD	BLANK EXPOSURE LAMP SERIAL DATA signal
CBCCDT	COPYBOARD COVER CLOSE DETECTION signal
[CLTH]	CLEANER THERMISTOR signal
[CPY_DNS]	COPY DENSITY VOLUME signal
CSTPDT	CASSETTE PAPER DETECTION signal
CSTS0	CASSETTE SIZE DETECTION 0 signal
CSTS1	CASSETTE SIZE DETECTION 1 signal
CSTS2	CASSETTE SIZE DETECTION 2 signal
CSTS3	CASSETTE SIZE DETECTION 3 signal
DSZ0*	DOCUMENT SIZE DETECTION 0 signal
DSZ1*	DOCUMENT SIZE DETECTION 1 signal
DSZ2*	DOCUMENT SIZE DETECTION 2 signal
DSZ3*	DOCUMENT SIZE DETECTION 3 signal
DV_AC_CNT	DEVELOPING AC BIAS CONTROL command
DV_AC_DR	DEVELOPING AC BIAS DRIVE command
DV_DC_CNT	DEVELOPING DC BIAS CONTROL command
DV_DC_DR	DEVELOPING DC BIAS DRIVE command
EXFAN0_DR	EXHAUST FAN 0 DRIVE command
EXFAN0_DT*	EXHAUST FAN 0 DRIVE DETECTION signal
EXFAN1_DR	EXHAUST FAN 1 DRIVE command
EXFAN1_DT*	EXHAUST FAN 1 DRIVE DETECTION signal
EXITPD	DELIVERY PAPER DETECTION signal
FEED_CL*	FEED ROLLER CLUTCH DRIVE command
HEAT_DR	FIXING HEATER DRIVE command
HEAT_ERR	FIXING HEATER ERROR DETECTION signal
HVT_DR	HVT DRIVE command
LMP_PWM	SCANNING LAMP PULSE WIDTH MODIFICATION signal
LMPDR	SCANNING LAMP DRIVE command
LMPDT	SCANNING LAMP DRIVE DETECTION signal
LNS_A	LENS MOTOR A command
LNS_A*	LENS MOTOR A* command
LNS_B	LENS MOTOR B command
LNS_B*	LENS MOTOR B* command
LNS_COM	LENS MOTOR DRIVE command
LNSHP	LENS HOME POSITION DETECTION signal
MLT_CL*	MULTIFEED ROLLER CLUTCH DRIVE command
MLT_SL*	MULTIFEED SOLENOID DRIVE command
MLTPD0	MULTIFEEDER PAPER DETECTION signal
MLTPD1	MULTIFEEDER PAPER WIDTH DETECTION signal 1
MLTPD2	MULTIFEEDER PAPER WIDTH DETECTION signal 2
MM_DR	MAIN MOTOR DRIVE command
MM_LKDT	MAIN MOTOR LOCK DETECTION signal
MMR_A	MIRROR MOTOR A command
MMR_A*	MIRROR MOTOR A* command
MMR_B	MIRROR MOTOR B command
MMR_B*	MIRROR MOTOR B* command
MMR_COM	MIRROR MOTOR DRIVE command
MRRHP	MIRROR HOME POSITION DETECTION signal
OPCNT_DR*	ACCESSORY COUNTER DRIVE command
OP_CAMHP	SWING CAM HOME POSITION DETECTION signal
OP_DRDT*	CASSETTE 2 RIGHT DOOR OPEN DETECTION signal
OP_DT*	CASSETTE 2 DETECTION signal
OP_CSTS_0	CASSETTE 2 SIZE DETECTION 0 signal
OP_CSTS_1	CASSETTE 2 SIZE DETECTION 1 signal
OP_CSTS_2	CASSETTE 2 SIZE DETECTION 2 signal
OP_CSTS_3	CASSETTE 2 SIZE DETECTION 3 signal
OP_MTDR	CASSETTE 2 MOTOR DRIVE command
OP_M_COM	CASSETTE 2 MOTOR DRIVE command
OP_M_A	CASSETTE 2 MOTOR A command
OP_M_A*	CASSETTE 2 MOTOR A* command
OP_M_B	CASSETTE 2 MOTOR B command
OP_M_B*	CASSETTE 2 MOTOR B* command
OP_PDT	CASSETTE 2 PAPER DETECTION signal
OP_PU_SL*	CASSETTE 2 PICK-UP SOLENOID DRIVE command
OP_VPDT	CASSETTE 2 VERTICAL PATH PAPER DETECTION signal
PREXP_DR*	PRE-EXPOSURE LAMP DRIVE command
PU_SL*	PICK-UP SOLENOID DRIVE command
PW_SW	POWER SWITCH signal
RDOPDT	RIGHT DOOR OPEN DETECTION signal
RG_CL*	REGISTRATION ROLLER CLUTCH DRIVE command
RGPDT	REGISTRATION PAPER DETECTION signal
SC_A	SCANNER MOTOR A command
SC_A*	SCANNER MOTOR A* command
SC_B	SCANNER MOTOR B command
SC_B*	SCANNER MOTOR B* command

SC_COM	SCANNER MOTOR DRIVE command
SCFAN_DR	COOLING FAN DRIVE command
SCFAN_DT*	COOLING FAN DRIVE DETECTION signal
SCHP	SCANNER HOME POSITION DETECTION signal
STFAN_DR	SORTER KIT FAN DRIVE command
STFAN_DT*	SORTER KIT FAN DRIVE DETECTION signal
TCNT_DR*	TOTAL COUNTER DRIVE command
[TH1]	FIXING MAIN THERMISTOR signal
TH1_DT	FIXING MAIN THERMISTOR DETECTION signal
[TH2]	FIXING SUB THERMISTOR signal
[TNEMP]	TONER EMPTY signal
TNFDT	WASTE TONER FULL DETECTION signal
TRQMLDT	WASTE TONER FEEDING SCREW LOCKED DETECTION signal
VPDT	VERTICAL PATH PAPER DETECTION signal
ZRCRSS	ZERO CROSS signal

2. Abbreviations

AER	AE ROTATION
INTR	INITIAL ROTATION
LSTR	LAST ROTATION
SCFW	SCANNER FORWARD
SCRV	SCANNER REVERSE
STBY	STANDBY
WMUP	WARM-UP
WMUPR	WARM-UP ROTATION

C. GENERAL CIRCUIT DIAGRAM


8
7
6
5
4
3
2
1
F
E
D
C
B
A
: NP7161/NP7210
: NP7210
: ACCESORY
P1
HEATER SWITCH (SW1)
CASSETTE/ DRUM HEATER (H2)
CASSETTE HEATER (H4)
MIRROR HEATER (H3)
ET1
ET2
J57
J52
J56
J58
J204
J207
FIXING HEATER (H1)
THERMO SWIITCH (SW1)
FT1
FT2
J59
F13
F14
F15
F16
RL1
TO J307
N
H
SCANNING LAMP (LA1)
THERMAL FUSE (FU1)
J55
MT4
MT3
MT2
FG
MT1
J51
J501
LAMP REGULATOR PCB
J503
5VU
LMPDR
LMP_PWM
LMPDT
GND
J203
J211
M1
MAIN MOTOR
J601
MM_LKDT*
MM_DR
GND
24V
J209
CL1
REGISTRATION ROLLER CLUTCH
RG_CL*
J29
TO RL1
J212
POWER SUPPLY PCB
NC
RG_CL*
LMPDR
LMPDT
LMP_PWM
TNFDT
TRQMLDT
DV_DC_CNT
DV_DC_DR
DV_AC_CNT
DV_AC_DR
HVT_DR
MM_LKDT*
MM_DR
HEAT_ERR
HEAT_DR
ZRCRSS
5V_ON
AC_24V_ON
J106
J208
J105
24V
GND
5VU
5VR
J307
HIGH-VOLTAGE TRANSFORMER PCB
J305
J304
J306
J301
J210
DV
GRID SEALED
SP
PR
TR
FT7
J303
J302
TRANSFER GUIDE VZ1
TNFDT
TRQMLDT
WASTE TONER SENSOR
J34
PS8
WASTE TONER FEEDING SCREW LOCKED SENSOR
J206
J951
ACCESORY POWER SUPPLY PCB
J953
J952
24V_ADF1
24V_ADF2
GND_ADF1
GND_ADF2
24V_SRT1
24V_SRT2
GND_SRT1
GND_SRT2
EXHAUST FAN 1 FM 2
EXHAUST FAN 2 FM 4
COOLING FAN1 FM1
J20
J22
J14
EXFAN1_DT*
EXFAN1_DR
EXFAN0_DT*
EXFAN0_DR
SCFAN_DT*
SCFAN_DR
TO CC-IV N
J790
CCD*
CCDT*
PRE-EXPOSURE LAMP LA2
J501
PREXP_DR*
SCANNER MOTOR M2
J37
SC_A
SC_B
SC_COM
SC_A*
SC_B*
SORTER KIT FAN FM5
J24
J123
STFAN_DT*
STFAN_DR
CONTROL PANEL PCB
J402
J401
J403
SEG0
SEG1
SEG2
SEG3
SEG4
SEG5
SEG6
SEG7
SEG8
SEG9
CPY_DNS
DIG0
DIG1
DIG2
DIG3
DIG4
PW_SW
DIG5
DIG6
DIG7
RET0
RET1
RET2
RET3
RET4
RET5
RET6
RET7
RET8
RET9
RET10
MIRROR HOME POSITION SENSOR PS3
LENS HOME POSITION SENSOR PS2
SCANNER HOME POSITION SENSOR PS1
J11
J10
J12
MRRHP
LNSHP
SCHP
MIRROR MOTOR M4
J39
MRR_B*
MRR_B
MRR_COM
MRR_A*
MRR_A
AE SENSOR
J531
AE_DATA
AE_REF
TONER SENSOR
TS1
J15
J721
J720
TNEMP
ACCESSORY COUNTER CNT2
TOTAL COUNTER CNT1
CNT
J32
J33
OPCNT_DR*
TCNT_DR*
LA3 BLANK EXPOSURE LAMP
J551
BLK_PW
BLK_CNDR*
BLK_DEN*
BLK_LCK
BLK_SCK
BLK_SD
LENS MOTOR M3
J38
LNS_B*
LNS_B
LNS_COM
LNS_A*
LNS_A
J104
J103
J102
J101
DC CONTROLER PCB
J125
J120
J121
J122
J110
J112
J109
J108
J124
J107
DSZ3*
DSZ2*
DSZ1*
DSZ0*
5VR
CBCCDT
J61
J62
J60
PS12
COPYBOARD COVER OPEN/CLOSE SENSOR
J66
J64
J65
J63
DS4
DOCUMENT SIZE DETECTION SENSOR 4
DS2
DOCUMENT SIZE DETECTION SENSOR 2
DS3
DOCUMENT SIZE DETECTION SENSOR 3
DS1
DOCUMENT SIZE DETECTION SENSOR 1
DF_TXD
DF_RXD
24V_ADF1
24V_ADF2
GND_ADF1
GND_ADF2
J750
J752
J754
TO ADF
ST_TXD
ST_RXD
J751
J753
J755
TO SORTER
24V_SRT1
24V_SRT2
GND_SRT1
GND_SRT2
AS_CNTP
AS_RXD
AS_TXD
J722
TO RDD
OP_CSTS_0
OP_CSTS_1
OP_CSTS_2
OP_CSTS_3
OP_PDT
OP_PU_SL*
OP_CAMHP
OP_VPDT
OP_DT*
OP_DRDT*
OP_M_B
OP_M_A
OP_MTDR
J701
TO CFM
CSTS_0
CSTS_1
CSTS_2
CSTS_3
J16
CASSETTE SIZE SWITCH PCB
CLTH
J23
TH3
CLEANER THERMISTOR
TH2
TH1_DT
TH1
TH1 SUB THER-MISTOR
TH1 MAIN THER-MISTOR
EXITPD
J21
PS6
DELIVERY PAPER SENSOR
VPDT
CSTPDT
PU_SL*
J40
J67
PS13
VERTICAL PATH PAPER SENSOR
J19
PS4
CASSETTE PAPER SENSOR
J36
SL1
PICK-UP SOLENOID
RDOPDT
MLT_SL*
MLT_CL*
J797
J47
J48
PS11
RIGHT DOOR OPEN SENSOR
J30
SL2
MULTI FEED SOLENOID
J31
CL3
MULTI FEED ROLLER CLUTCH
MLTPD2
MLTPD1
MLTPD0
FEED_CL*
J796
J743
PS10
MULTI-FEEDER PAPER WIDTH SENSOR 2
J742
PS9
MULTI-FEEDER PAPER WIDTH SENSOR 1
J18
PS7
MULTI-FEEDER PAPER SENSOR
J35
CL2
FEED ROLLER CLUTCH
RGPDT
J700
J17
PS5
REGISTRATION PAPER SENSOR

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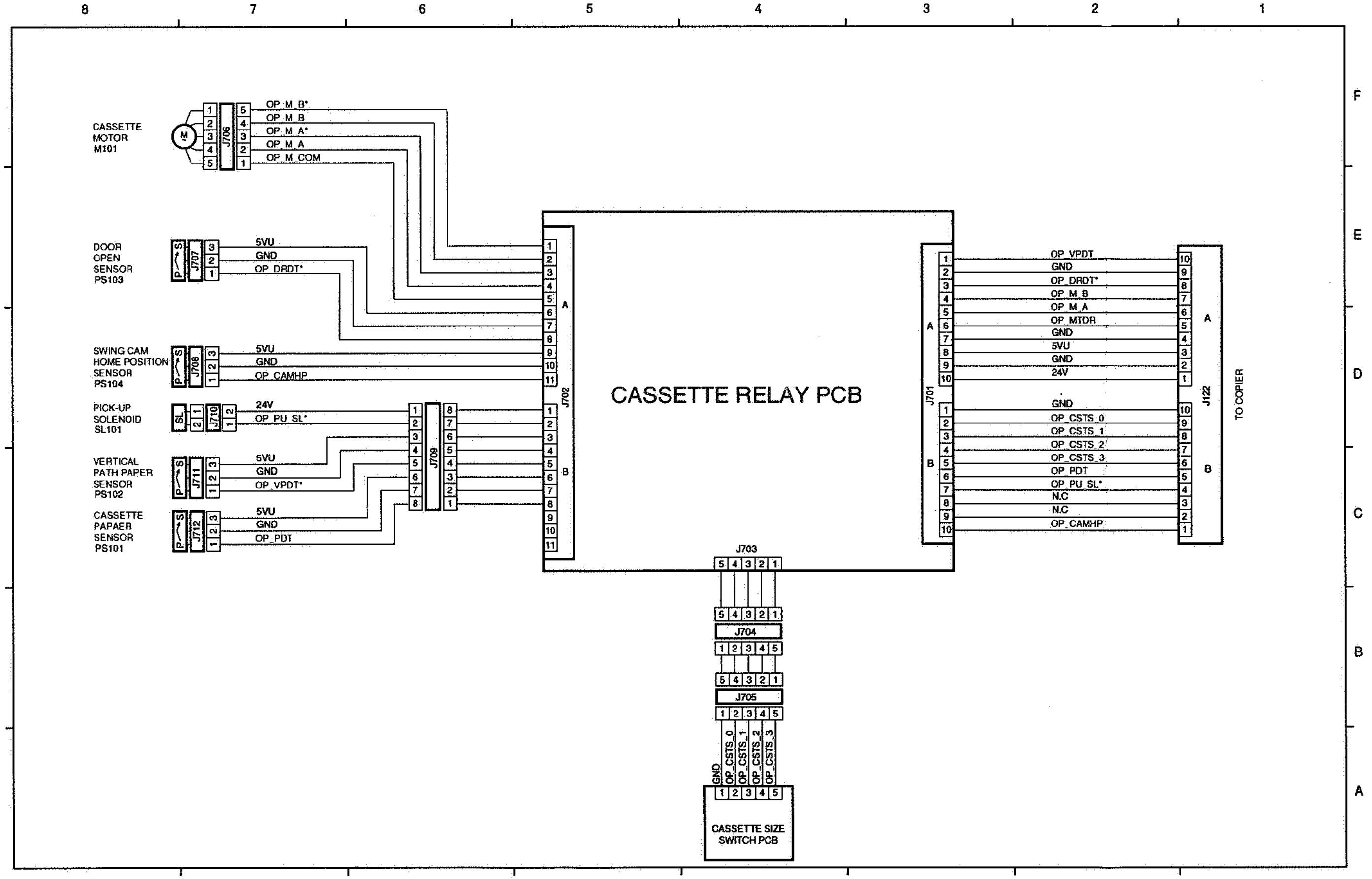
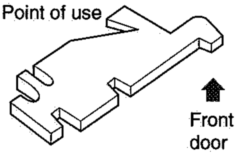
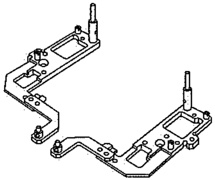
D. CASSETTE FEEDING MODULE CIRCUIT DIAGRAM


8
7
6
5
4
3
2
1
F
E
D
C
B
A
CASSETTE MOTOR M101
M
J706
OP_M_B*
OP_M_B
OP_M_A*
OP_M_A
OP_M_COM
DOOR OPEN SENSOR PS103
J707
5VU
GND
OP_DRDT*
SWING CAM HOME POSITION SENSOR PS104
J708
5VU
GND
OP_CAMHP
PICK-UP SOLENOID SL101
SL
J710
24V
OP_PU_SL*
VERTICAL PATH PAPER SENSOR PS102
J711
5VU
GND
OP_VPDT*
CASSETTE PAPAER SENSOR PS101
J712
5VU
GND
OP_PDT
J709
J702
A
B
CASSETTE RELAY PCB
J701
OP_VPDT
GND
OP_DRDT*
OP_M_B
OP_M_A
OP_MTDR
GND
5VU
GND
24V
GND
OP_CSTS_0
OP_CSTS_1
OP_CSTS_2
OP_CSTS_3
OP_PDT
OP_PU_SL*
N.C
N.C
OP_CAMHP
J122
TO COPIER
J703
J704
J705
GND
OP_CSTS_0
OP_CSTS_1
OP_CSTS_2
OP_CSTS_3
CASSETTE SIZE SWITCH PCB

E. SPECIAL TOOLS LIST

No.	Tool description	Tool No.	Shape	Notation	Remarks
1	Door switch	TKN-0093		A	
2	Mirror positioning tool	FY9-3046		B	For adjusting the No. 1/No. 2 mirror position (front/rear as a pair)

F. SOLVENTS AND OILS

No.	Description	Use	Composition	Description
1	Ethyl alcohol (Etanol) Isopropyl alcohol (Isopropanol)	Cleaning: e.g., glass, plastic, rubber parts; external covers	C_2H_5O $(CHZ_3)_2\ CHOH$	• Do not bring near open fire. • Procure locally. • Isopropyl alcohol may be substituted.
2	MEK	Cleaning: e.g., metal; oil or toner	$CH_3COC_2H_5$	• Do not bring near fire. • Procure locally.
3	Heat-resisting grease	Lubricating; e.g., fixing drive assemblies	Lithium soap (mineral oil family) Moblybdenum bisulfide	• CK-0427 (500 g/can)
4	Lubricant oil		Mineral oil (paraffin family)	• CK-0451 (100 cc)
5	Lubricant oil		Mineral oil (paraffin family)	• CK-0524 (100 cc)
6	Lubricant oil	Lubricating: scanner rail	Slicone oil	• CK-0551 (20 g)

Prepared by
OFFICE IMAGING PRODUCTS TECHNICAL SUPPORT DEPT. 1
OFFICE IMAGING PRODUCTS TECHNICAL SUPPORT DIV.
CANON INC.
Printed in Japan
REVISION 0 (AUG. 1998) [23715]
REVISION 1 (DEC. 1998) [23715]

5-1, Hakusan 7-chome, Toride-shi, Ibaraki 302-8501, Japan

Canon

This publication is printed on
70% reprocessed paper.

PRINTED IN JAPAN (IMPRIME AU JAPON)
0199S0.95-2